

# SOIL SURVEY

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## **Elmore County Alabama**

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UNITED STATES DEPARTMENT OF AGRICULTURE

Soil Conservation Service

In cooperation with

ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES

# *How to Use* THE SOIL SURVEY REPORT

**F**ARMERS who have worked with their soils for a long time know about the soil differences on their farms, perhaps also on the farms of their immediate neighbors. What they do not know, unless soil surveys have been made, is how nearly their soils are like those on experiment stations or on other farms, either in their State or other States, where farmers have gained experience with new or different farming practices or farm enterprises. They do not know whether higher yields obtained by farmers in other parts of their county and State are from soils like theirs or from soils so different that they could not hope to get yields as high, even if they followed the same practices. One way for farmers to avoid some of the risk and uncertainty involved in trying new production methods and new varieties of plants is to learn what kinds of soils they have so that they can compare them with the soils on which new developments have proved successful.

## SOILS OF A PARTICULAR FARM

A colored soil map accompanies this report. To find what soils are on any farm or other land, it is necessary first to locate this land on the map. This is easily done by finding the precinct and section in which the farm is located and by using landmarks such as roads, streams, villages, dwellings, and other features to locate the boundaries.

Each kind of soil mapped within the farm or tract is marked on the map with a symbol. For example, all the areas marked Ba are Bowie sandy loam. The color in which the soil area is shown on the map will be the same as the color indicated in the legend for the particular type of soil. If you want information on the Bowie soil, turn to the section in this publication on Descriptions of the Soil Units and find Bowie sandy loam. Under this heading you will find a statement of what the characteristics of this soil are, what the soil is mainly used for, and some of the uses to which it is suited.

Suppose, for instance, you wish to know how productive Bowie sandy loam

is. You will find the soil listed in the left-hand column of table 6. Opposite the name you can read the yields for the different crops grown on it. This table also gives estimated yields for all the other soils mapped in the county.

If, in addition, you wish to know what uses and management practices are recommended for Bowie sandy loam, read what is said about this soil in the section on Descriptions of the Soil Units. Refer also to the section headed Estimated Yields and Soil Uses and Management, where the soils suited to the same uses and management practices are grouped together.

## SOILS OF THE COUNTY AS A WHOLE

A general idea of the soils of the county is given in the section on Soil Series and Their Relations, which tells about the principal kinds of soils, where they are found, and how they are related to one another. After reading this section, study the soil map and notice how the different kinds of soils tend to be arranged in different parts of the county. These patterns are likely to be associated with well-recognized differences in type of farming, land use, and land-use problems.

A newcomer to the county, especially if he considers purchasing a farm, will want to know about the climate; the types and sizes of farms; the principal farm products and how they are marketed; the kind and conditions of farm tenure, including tenancy; availability of roads, railroads, electric services, and water supplies; the industries of the county; and cities, villages, and population characteristics. Information about all these will be found in the section on General Nature of the Area and on Agriculture.

Those interested in how the soils of the county were formed and how they are related to the great soil groups of the world should read the section on Morphology and Genesis of Soils.

This publication on the soil survey of Elmore County, Alabama, is a cooperative contribution from the—

SOIL CONSERVATION SERVICE

and the

ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES

# SOIL SURVEY OF ELMORE COUNTY, ALABAMA<sup>1</sup>

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United States Department of Agriculture in cooperation with the Alabama Department of Agriculture and Industries

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<sup>2</sup> Field work was done while Soil Survey was part of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

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**E**LMORE COUNTY, situated in the east-central part of Alabama, lies within two physiographic regions—the Piedmont province and the Coastal Plain. Its mild climate encourages the growth of a large number of crops, including many winter-growing ones. The acreage of corn is greatest and that of cotton next. Hay crops, peanuts, oats, and sorghum and sugarcane for sirup are also common crops. Most of the livestock products are consumed at home, but poultry (chiefly chickens) and poultry products are an important source of cash income. Pastures on overflow bottoms and poorly drained basins, and forest on the soils with broken and hilly relief, are important to the agriculture. The county is prominent in the production of electricity, as four large dams are wholly or partly within its boundaries. To provide a basis for the best uses of the land a cooperative survey was made in 1939 by the United States Department of Agriculture and the Alabama Department of Agriculture and Industries. Unless otherwise stated, all information in this report refers to conditions in the county at the time of the survey.

## GENERAL NATURE OF THE AREA

### LOCATION AND EXTENT

Elmore County, situated in the east-central part of Alabama (fig. 1), is almost rectangular in shape. The eastern and southern boundaries, formed by the Tallapoosa and Alabama Rivers, respectively, are irregular. The county has a total area of 659 square miles or 421,760 acres. The total area is made up of approximately 401,920 acres of land and 19,840 acres of water. Wetumpka, the county seat, is 15 miles north of Montgomery and 75 miles southeast of Birmingham.

### PHYSIOGRAPHY, RELIEF, AND DRAINAGE

The physiographic features of the county are varied. Broad and comparatively level terraces and stream bottoms occur on the Tallapoosa, Coosa, and Alabama Rivers (particularly south of Wetumpka and Elmore and following the Tallapoosa River to its intersection with the Coosa). Upland areas are level to gently rolling, rolling to hilly, and hilly to extremely broken where they adjoin the Tallapoosa and Coosa Rivers and their tributaries in the northeastern part of the county.

The county may also be divided, physiographically, into the Piedmont province and the Coastal Plain. The former, occurring in the northern and northeastern parts of the county, includes the highest elevations and the most rolling to broken land of the county. The Coastal Plain, located in the southern and western parts of the county, constitutes the more sandy part. The elevations range from less than 200 feet adjacent to the rivers to as much as 746 feet on the ridgetops around Seman. The Coastal Plain areas generally are more favorable for farming because of the milder slopes.

The elevations of the following towns are based upon data taken from United States Geological Survey topographic maps: Elmore, 172 feet; Coosada, 178 feet; Wetumpka, 182 feet; Tallassee, 202 feet; Deatsville, 306 feet; Buyck, 459 feet; Kent, 594 feet; Central, 637 feet; Channahatchee, 639 feet; and Seman, 746 feet.

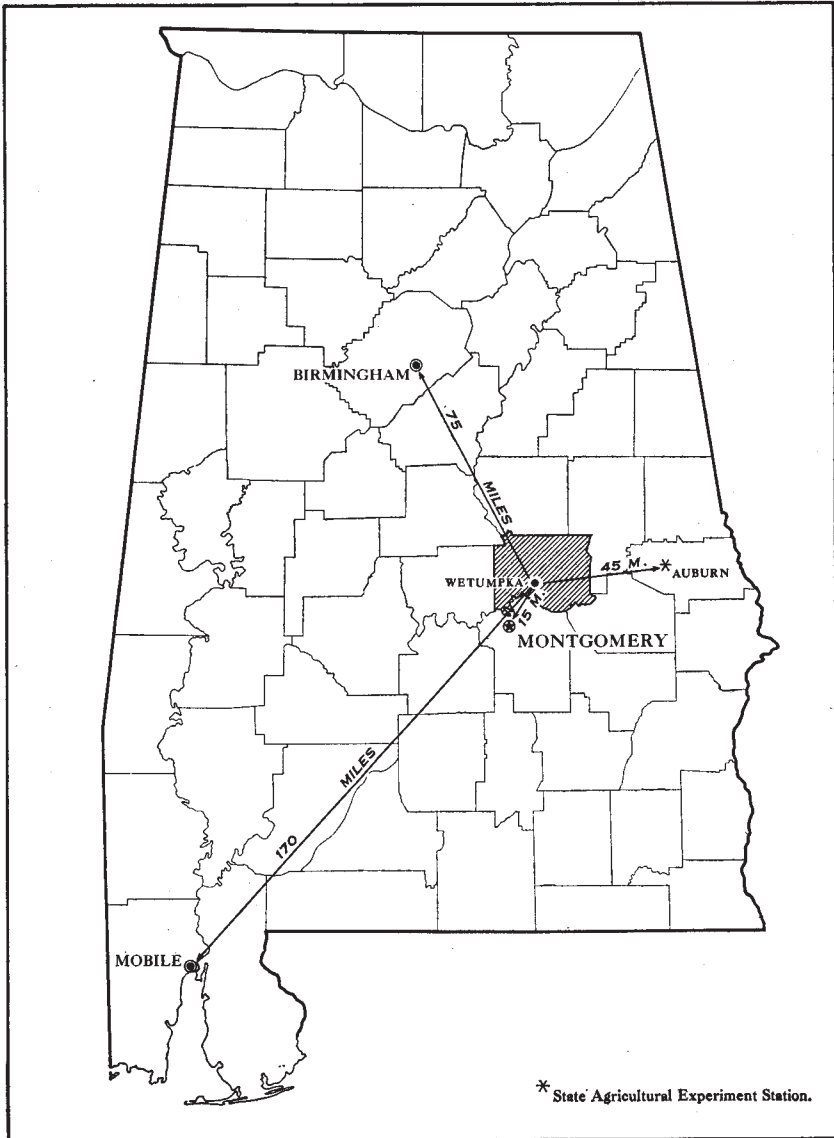


FIGURE 1.—Location of Elmore County in Alabama.

Most parts of the county are well drained. Most of the larger tributaries of the principal rivers, especially in the southern half of the county, have carved out wide valleys. In the hilly Piedmont region of crystalline rocks, the valleys are deep and narrow. Natural drainage is well established throughout the upland part of the county.

The drainage waters of the county flow through three systems: those of the Coosa, Tallapoosa, and Alabama Rivers. The Alabama

River is formed by the confluence of the Coosa and Tallapoosa Rivers at the southern boundary of the county about 5 miles southwest of Wetumpka. The Tallapoosa River forms the entire eastern boundary, as well as the southern boundary of the county to the point where it intersects the Coosa River to form the Alabama River. The Alabama River continues in a southwesterly direction and completes the southern boundary.

### CLIMATE

The climate of Elmore County is characterized by long, warm summers and short, relatively mild winters. The difference between the average summer and winter temperatures is 31.6° F. The temperature is therefore favorable for the production of a large number of crops, including many winter-growing ones.

The average annual temperature of the county, based on climatic data obtained at Wetumpka, is 65.5°. The average temperature in summer is 80.9° and in winter 49.3°. The summers are warm, temperatures often exceeding 90° between June and September. Frost and freezing temperatures occur from 10 to 20 times each winter. More than 3 frosts, or freezes, on successive nights are unusual and are generally followed by rain. The soil is seldom frozen to a depth of more than 1 inch, and it generally thaws out during the day. Snow is rare, and several years may pass with no snowfall.

The average annual precipitation is about 52 inches. During the summer months gardens, farm crops, and pasture are often severely damaged by prolonged dry periods. The winter and spring seasons are the wettest.

The normal monthly, seasonal, and annual temperature and precipitation at Wetumpka, Elmore County, Alabama, are given in table 1.

The average length of the frost-free season is 236 days, or from March 22 to November 13. The latest recorded frost is April 15, and the earliest is October 17. The frost-free season is always long enough to ripen all staple crops. Sugarcane and late-planted sweetpotatoes, where grown on low ground, may sometimes be nipped by frosts. The more frost-resistant plants—onions, collards, cabbage, radishes, rape, oats, and rye—remain green throughout the winter. These crops, however, usually make slow growth unless given a good start by early fall planting. Freezes are sometimes injurious, but winter injury to garden vegetables can be prevented if the crops are covered with pine straw.

High winds do little damage; the annual average wind movement is only 5 miles an hour, the greatest velocity occurring in spring and the least in midsummer. Prevailing winds are from the north in winter, from the south in spring, from the northwest in summer, and from the northeast in fall. Summer days are often sultry, but the nights are usually cooled by breezes.

### ORGANIZATION AND POPULATION

Although some Scotch and English traders settled in the county in 1763, it was not until 1814 to 1820 that any great number of settlers arrived. In 1814, Isaac Ross bought Fort Toulouse, the first deed

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Wetumpka, Elmore County, Ala.*

[Elevation, 205 feet]

Month	Temperature <sup>1</sup>			Precipitation <sup>2</sup>			
	Average	Absolute maximum	Absolute minimum	Average	Total for the driest year	Total for the wettest year	Average snow-fall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December----	49. 1	82	12	5. 43	6. 81	3. 38	( <sup>3</sup> )
January-----	48. 7	84	8	4. 56	. 30	5. 50	0. 2
February-----	50. 1	84	-7	5. 54	6. 00	12. 22	. 4
Winter-----	49. 3	84	-7	15. 53	13. 11	21. 10	. 6
March-----	57. 9	91	21	5. 86	2. 76	14. 56	. 1
April-----	64. 4	94	29	4. 39	1. 55	4. 40	( <sup>3</sup> )
May-----	72. 6	104	39	3. 55	2. 06	10. 83	0
Spring-----	65. 0	104	21	13. 80	6. 37	29. 79	. 1
June-----	79. 8	108	48	4. 15	4. 65	4. 04	0
July-----	81. 7	108	55	4. 82	2. 00	1. 57	0
August-----	81. 2	104	56	4. 73	2. 85	2. 30	0
Summer-----	80. 9	108	48	13. 70	9. 50	7. 91	0
September----	77. 5	107	40	2. 97	1. 45	3. 72	0
October-----	67. 0	99	28	2. 69	1. 20	4. 59	0
November-----	55. 9	88	16	3. 18	2. 50	14. 45	( <sup>3</sup> )
Fall-----	66. 8	107	16	8. 84	5. 15	22. 76	( <sup>3</sup> )
Year-----	65. 5	108	-7	51. 87	<sup>4</sup> 34. 13	<sup>5</sup> 81. 56	. 7

<sup>1</sup> Average temperature based on 57-year record, 1895 to 1951; highest and lowest temperatures from 36-year record, 1895 to 1930.

<sup>2</sup> Average precipitation based on 61-year record, 1891 to 1951; wettest and driest years based on 39-year record, 1892 to 1930; snowfall on 36-year record, 1895 to 1930.

<sup>3</sup> Trace.

<sup>4</sup> In 1927.

<sup>5</sup> In 1929.

conveyed in Elmore County. Six years later Carolinians and Georgians settled in the southwestern part of the county, around Coosada and Elmore Station; the northern part was settled later.

In 1866 the county was created from parts of Montgomery, Autauga, Coosa, and Tallapoosa Counties and named in honor of General John A. Elmore. With the exception of a 4-square-mile area adjacent to the Tyler Goodwin Bridge, ceded to Montgomery County in 1923, the county remains the same as when originally formed.

According to the Federal census of 1950, the population of the county was 31,649. Wetumpka (population, 3,813) and Tallassee (4,225, of which 2,015 was in Tallapoosa County) are the largest towns. Other towns are Eclectic, Deatsville, Elmore, Holtville, Speigner, and Coosada.

### RAILROADS AND ROADS

The Louisville and Nashville Railroad traverses the southwestern part of the county, accommodating Millbrook, Coosada, Elmore, Speigner, and Deatsville. A branch line extends from Elmore to Wetumpka. Tallassee is served by a branch line railroad connecting with the Western Railway of Alabama at Milstead, Macon County. Water transportation is possible to Wetumpka by way of the Alabama and Coosa River.

Public roads reach all parts of the county. The main highways between the towns are paved, and most of the other roads are graded and graveled. In 1950, 1,398 farms were located on hard surface roads; 581 on gravel, shell, or shale; and 1,173 on dirt or unimproved. In the same year, distance over dirt or unimproved roads to the trading center most frequently visited was 0 to 0.2 miles for 1,155 farms; 0.3 to 0.9 for 376; 1.0 to 4.9 for 1,073; and 5.0 miles and more for 37.

Distance to the most frequently visited trading center in 1950 was under 1 mile for 558 farms; 1 to 4 miles for 1,268; 5 to 9 miles for 687; and 10 miles or more for 701.

Wetumpka and Tallassee are important manufacturing and trading centers.

### SCHOOLS AND OTHER PUBLIC FACILITIES

High schools are located at Wetumpka, Tallassee, Holtville, and Eclectic and junior high schools at Sewell Memorial, Weoka, Lightwood, Kent, Robinson Springs, Friendship, and Deatsville. Bus accommodations are available to all points of the county. Elementary schools are scattered over the county.

Rural electric lines are well distributed. In 1950 they supplied about 72 percent of the farms in the county. In the same year 308 farms, about 9 percent of the total, had telephones. Rural mail routes are accessible to all residents.

## AGRICULTURE

### AGRICULTURAL HISTORY

The agricultural history of Elmore County dates back to the early settlements of 1814 to 1820. At that time very crude methods of agriculture were practiced. In 1820 settlers from the Carolinas and Georgia moved into the southwestern part of the county and began clearing land for agriculture. Shortly after, settlers moved into the northern part of the county around Buyck. As more settlers arrived, the more desirable land was rapidly taken.

The first concern of the settlers was to provide the necessities of life, mainly food crops—corn, wheat, oats, potatoes, and vegetables. Some rice and tobacco were produced. A few livestock were pastured on the open range. Cotton soon became the principal cash crop. It was ginned and baled and then hauled to the river landings for shipment to outside markets to be sold or exchanged for supplies. The early farmers used no commercial fertilizers but opened new fields when the yields on the old ones became unsatisfactory.

According to the early United States census reports, the agriculture consisted largely of growing corn, small grains, and some hay and cotton and raising swine, cattle, sheep, and goats. Although these



products have been among the principal sources of agricultural income during most of the history of the county, they have differed in relative importance. A number of changes have taken place in agriculture from time to time.

### CROPS

The acreage of the various crops has changed somewhat since 1920. The acreage of the principal crops grown and the number of bearing fruit and nut trees, based on Federal census reports for the years stated, are given in table 2.

TABLE 2.—*Acreage of the principal crops and number of bearing fruit and nut trees in Elmore County, Ala., in stated years*

Crop	1919	1929	1939	1949
Cotton.....	43, 341	68, 930	38, 361	30, 597
Corn.....	45, 265	38, 415	57, 118	39, 135
Hay and forage.....	2, 923	1, 647	6, 261	6, 339
Oats, threshed.....	3, 854	444	2, 874	1, 628
Sugarcane for sirup.....	557	425	657	<sup>1</sup> 256
Sorghum for sirup.....	641	134	216	( <sup>2</sup> )
Sweetpotatoes.....	1, 514	1, 061	982	521
Potatoes.....	110	70	143	38
Peanuts.....	930	377	1, 025	117
Dry peas.....	4, 215	404	977	240
Dry edible beans.....		297	959	( <sup>3</sup> )
	<i>Number</i> <sup>4</sup>	<i>Number</i> <sup>4</sup>	<i>Number</i> <sup>4</sup>	<i>Number</i> <sup>4</sup>
Pear.....trees.....	1, 247	873	1, 915	1, 273
Peach.....do.....	19, 503	16, 851	24, 426	13, 054
Apple.....do.....	6, 900	4, 268	6, 990	3, 013
Pecan.....do.....	1, 195	9, 287	22, 978	28, 763

<sup>1</sup> Sugarcane or sorghum for sirup.

<sup>2</sup> Included in the sugarcane for sirup acreage.

<sup>3</sup> Not reported.

<sup>4</sup> Number in census year, which is 1 year later than specified at head of column.

The acreage in hay and forage crops has increased, but that in cotton has decreased. The per-acre yield of cotton, however, increased considerably, owing to the increased use of fertilizers and other improved agricultural practices, especially tillage and seed treating.

Oats production has fluctuated sharply. The production of oats interferes with that of cotton; consequently, as the price of cotton increases, there is a sharp drop in the production of oats.

Wheat production has almost ceased. There is one rolling mill for flourmaking in the county.

Sugarcane and sorghum sirup have been produced almost exclusively for home use, but a small amount is sold in local markets. The acreage planted decreased, but the per-acre yield increased, thus maintaining a fairly even production for the census period from 1930 to 1950.

Vegetables, including beans, cabbage, cucumbers, melons, peas, tomatoes, and sweet corn, were planted on 1,874 acres in 1949. They are marketed locally in Wetumpka or taken to Montgomery and Birmingham and sold at a curb market.



Recently there has been a marked tendency to produce more food crops for home use and feed for livestock production at the expense of cotton production. More and better pastures were developed by applying phosphate and lime. Most of the improved pasture is located on overflow bottoms and poorly drained basins, principally on Roanoke, Congaree, Myatt, and Rains soils, and consists of Dallisgrass, lespedeza, white Dutch clover, orchardgrass, Bermudagrass, and carpetgrass. The latter is naturally adapted to these soils and tends to choke out the more desirable grasses and legumes. The less well improved pasture grows principally lespedeza, some carpetgrass, and possibly some Bermudagrass.

### LIVESTOCK AND LIVESTOCK PRODUCTS

The number of livestock on farms in the county in stated years is given in table 3.

TABLE 3.—*Number of livestock on farms in Elmore County, Ala., in stated years*

Livestock	1920	1930	1940	1950
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses.....	1, 772	672	<sup>1</sup> 623	805
Mules.....	4, 144	5, 100	<sup>1</sup> 4, 595	3, 169
Cattle.....	14, 909	9, 724	<sup>1</sup> 13, 045	21, 903
Swine.....	15, 714	8, 842	<sup>2</sup> 8, 632	13, 807
Sheep.....	506	644	<sup>3</sup> 312	93
Goats.....	697	507	<sup>2</sup> 235	( <sup>4</sup> )
Poultry.....	99, 895	78, 322	86, 950	<sup>2</sup> 96, 357

<sup>1</sup> Over 3 months old.

<sup>2</sup> Over 4 months old.

<sup>3</sup> Over 6 months old.

<sup>4</sup> Not reported.

The number of horses and mules together totaled 3,974 in 1950; and a large percentage of them were in good to excellent condition.

Both dairy and beef cattle are raised. Dairying is carried on chiefly in the vicinities of Tallassee and Wetumpka. The milk and butter are consumed at home or sold locally. The beef cattle are raised in small herds throughout the county and sold mainly at one of the Montgomery markets. Jersey is the most popular dairy cattle breed; Hereford, Black Angus, and mixed breeds are the most popular beef cattle.

Duroc and Poland China are the most popular breeds of hogs. Sheep have decreased in number. Most of them are raised for home and local market, and a few are sold on the Montgomery market. Parasites, roaming dogs, and lack of pasture facilities possibly account for the decline in number of sheep.

Poultry (mainly chickens) and poultry products are important sources of cash income. Some turkeys and a few ducks and geese are kept. Poultry is produced both as a specialty and as an adjunct to other types of farming. Leghorns have been and are still popular but there is a recent trend toward New Hampshire Reds, especially in commercial hatcheries.

### SIZE AND NUMBER OF FARMS

The number of farms decreased from 4,250 in 1930 to 3,355 in 1950. Conversely, the size of farms increased from 61 acres in 1930 to 98 acres in 1950.

Although the size of farms ranges from 3 to more than 1,000 acres, 1,470 farms, or approximately 44 percent of them, were between 10 to 50 acres in size in 1950. Only 35 farms contained more than 1,000 acres in this year. The larger farms are in the southern and western parts of the county and the smaller farms are in the northern part.

### FARM EQUIPMENT AND WORK POWER

There has been a marked tendency in the last few years to supplement horse and mule power on farms with tractors. A total of 541 tractors were reported in 1950. These are fairly well distributed, although more are in the central, southern, and western parts of the county. There were 792 motortrucks and 1,446 automobiles on farms during 1950. There were also a small number of grain combines, corn pickers, pick-up hay balers, upright silos, and milking machines.

The farms are classified by work power as follows: No tractor, horses, or mules, 1,000 farms reporting; no tractor and only 1 horse or mule, 1,020; no tractor and 2 or more horses, mules, or both, 898; tractor and horses, mules, or both, 231; and tractor and no horses or mules, 206.

### FARM TENURE AND LABOR

According to the 1950 census, 62.5 percent of the farms were operated by landowners, 37.3 percent by tenants, and 0.2 percent by managers. Tenancy has decreased from 64.6 percent in 1930 to 37.3 percent in 1950. In 1950 the tenants were: Cash, 531; share-cash, 16; share, 189; croppers, 415; and other, 102.

Most of the tenants who work on shares receive half of the crops produced if the landowners supply land and work stock. Under this system, the fertilizer and seed costs are generally shared equally. If the tenant supplies the work stock, he receives two-thirds of the corn and hay crops and three-fourths of the cotton. There are many modifications of these basic rental contracts, and each landowner has his own system to fit his particular farm. Since the livestock raising has increased in importance, many farmers have developed rental systems involving shares of the livestock produced on the farm.

Farm labor is plentiful during normal periods. In the northern part of the county a large part of the work is done by members of the family and some additional labor is hired during the rush season. In the southern and western parts of the county, a large part of the farm labor is supplied by Negroes who live on the farms.

### SOIL SURVEY METHODS AND DEFINITIONS

Soil surveying consists of examining, classifying, and mapping of soils in the field. The soil scientist walks over the area at intervals not more than a quarter of a mile apart and bores into the soil with an auger or digs holes with a spade. Each such boring or hole shows the soil to consist of several distinctly different layers, called horizons, which collectively are known as the soil profile. Each of these layers is studied carefully for the things about it that affect plant growth.

The color of each layer is noted. There is usually a relationship between the darkness of the topmost layer of the soil and its content of organic matter; streaks and spots of gray, yellow, and brown in lower layers generally indicate poor drainage and poor aeration.

Texture—the content of sand, silt, and clay in each layer—is determined by the feel of the soil when rubbed between the fingers and is checked by mechanical analysis in the laboratory. Texture determines to a considerable extent the quantity of moisture the soil will hold available to plants, whether plant nutrients or fertilizer will be held by the soil in forms available to plants or will be leached out, and the difficulty or ease of cultivating the soil.

Soil structure, or granulation, and the number of pores or open spaces between soil particles determine the permeability or perviousness of the soil, and consequently the ease with which plant roots penetrate the soil and water enters it.

Consistence, or the tendency of the soil to crumble or to stick together, determines the degree of difficulty that will be encountered in keeping the soil open and porous under cultivation. Consistence covers such soil characteristics as hardness, friability, plasticity, stickiness, compactness, toughness, and cementation.

Surface soil, as used in this report, refers to the lighter textured surface layer, which generally extends to depths ranging from 6 to 12 inches. The subsoil is the deeper and heavier textured layer, which generally is uniformly colored in well-drained soils.

The kind of rocks and the parent soil material that develops from these rocks affect the quantity and kind of plant nutrients found in the soil. Simple chemical tests show how acid the soil may be. In a practical sense, the degree of acidity may be thought of as the degree of poverty in lime (available calcium), or as indicating the quantity of lime that should be applied for certain crops, such as some of the legumes. An alkaline soil is rich in available calcium, and neutral soil contains a quantity sufficient for any crop commonly grown. The term reaction<sup>3</sup> is used to express how acid or how alkaline a soil may be.

The depth to bedrock or to compact layers is determined. The quantity of gravel or rocks that may interfere with cultivation, the steepness and kind of slope, the quantity of soil lost by erosion, and other external features are also observed.

On the basis of these characteristics, soils that are much alike in the kind, thickness, and arrangement of layers are mapped as one soil type. A phase is a subdivision of the type. Some soil types have a narrow range of characteristics and hence are not divided into phases; others have a wide range and are mapped in two or more phases. For example, a soil type that has slopes that range from

<sup>3</sup> The reaction of the soil is its degree of acidity or alkalinity, expressed mathematically as the pH value. A pH value of 7 indicates precise neutrality, higher values alkalinity, and lower values acidity. Terms that refer to reaction that are commonly used in this report are defined in the Soil Survey Manual, United States Department of Agriculture Handbook No. 18, as follows:

<i>pH</i>		<i>pH</i>	
Extremely acid.....	Below 4.5	Neutral.....	6.6-7.3
Very strongly acid.....	4.5-5.0	Mildly alkaline.....	7.4-7.8
Strongly acid.....	5.1-5.5	Moderately alkaline.....	7.9-8.4
Medium acid.....	5.6-6.0	Strongly alkaline.....	8.5-9.0
Slightly acid.....	6.1-6.5	Very strongly alkaline..	9.1 and higher

about 0 to 30 percent may be mapped in three phases, as Cataula gravelly sandy loam (the normal or undulating phase), which has 0 to 6 percent slopes; Cataula gravelly sandy loam, rolling phase, which has 7 to 12 percent slopes; and Cataula gravelly sandy loam, hilly phase, which has 13 to 30 percent slopes. A soil type will be broken into phases primarily because of differences in the soil other than those of kind, thickness, and arrangement of layers. The slope of a soil, the frequency of outcropping bedrock, the relative elevation as it affects the frequency of overflow (of flood plain soils), and the extent of erosion are examples of characteristics that might cause a soil type to be divided into phases.

Two or more soil types may have similar profiles; that is, the soil layers may be nearly the same, except that the texture, especially of the surface layer, will differ. As long as the other characteristics of the soil layers are similar, these soils are considered to belong in the same soil series. A soil series, therefore, consists of all the soil types, whether the number be one or several, that are, except for texture—particularly the texture of the surface layer—about the same in kind, thickness, and arrangement of layers.

The name of a place near where a soil series was first found is chosen as the name of the series. Thus, Bowie, Red Bay, and Cataula are names of three soil series in Elmore County. The name of the surface texture is added to the series name to give the type name. Cecil sandy loam and Cecil clay loam are names of two types within the Cecil series. They differ in the texture of the surface soils, as their names show.

Where two or more kinds of soil are so intricately mixed that they cannot be shown separately on a map of the scale used, they are mapped together, and the areas of the mixture are called a soil complex. Faceville-Bowie gravelly sandy loams, hilly phases, is a complex of Faceville gravelly sandy loam, hilly phase, and Bowie gravelly sandy loam, hilly phase, in Elmore County.

Bare rocky hillsides that have little true soil are not designated with series and type names but are given descriptive names, such as Rough stony land, Rough broken land (Cecil soil material), and Swamp.

The soil type or, where the soil type is subdivided, the soil phase is the unit of mapping in soil surveys. It is the unit or the kind of soil that is most nearly uniform and has the narrowest range of characteristics. For this reason use and management practices can be more definitely specified for it than for broader groups of soils that contain more variation. One can say, for example, that soils of the Red Bay series have permeable subsoils and respond well to applications of commercial fertilizer in the production of the crops common to the region. However, Red Bay sandy loam has mild slopes, is suited to intensive cultivation in a diversified cropping system, and requires only moderate care to control erosion; whereas Red Bay fine sandy loam, eroded sloping phase, has stronger slopes, is subject to both sheet and gully erosion when under intensive cultivation, and requires considerable care to control erosion. The moisture-holding capacity is not so great as in the normal phase, and it should be increased by incorporating greater quantities of organic matter.

## SOILS

### SOIL SERIES AND THEIR RELATIONS

The soils of Elmore County, though predominantly light-colored, exhibit all shades from light gray or yellowish gray through brownish gray to reddish brown and red. The lightest colored soils are those in the Coastal Plain, or sandy part of the county; the darkest ones prevail in the Piedmont province. This is particularly true in the color of the subsoils. Organic-matter content is usually low, as climatic conditions are unfavorable for its accumulation. Both surface soils and subsoils range from slightly acid to very strongly acid in reaction.

A glossary (p. 114) gives the definitions of some soil terms used in the report.

Textures of the soils range from sands to clays. The consistence of the subsoils varies from loose and friable to firm or slightly compact and plastic. Many rounded quartz gravel are on the surface and mixed with the soils in some localities in the Coastal Plain, whereas gneiss, hornblende schist, and angular quartz fragments are scattered over the surface in the Piedmont province.

Large areas have sloping, rolling, or hilly relief. If used for clean-cultivated crops, such areas will require terracing, stripcropping, and contour cultivation, as well as the growing of intertilled crops, to control soil loss from surface wash. Both surface wash and gully erosion are noticeable, particularly in the Piedmont plateau. Considerable erosion has taken place on soil where the slope is less than 5 percent. Large areas of Cecil sandy loam in the northern part of the county, uneroded not too long ago, now have much of their sandy surface soil removed through sheet erosion and the red clay subsoil exposed. This eroded condition, particularly on the more sloping areas, is largely the result of growing clean-cultivated crops year after year on the same soil. Many of the steeper slopes should not have been cleared of their native vegetation. After some of these areas were farmed for a few years, they became eroded and were left to grow up in old-field pine, sweetgum, and post oak.

The soils of the county are classified into two groups according to their parent materials. In the northern one-fifth of the county, which is in the Piedmont province, the soils have developed from the weathered products of the underlying rocks; in the Coastal Plain section they have formed from the weathering of beds of sand, sandy clay, and clay. The soils in these two regions differ widely in color, texture, consistence, and chemical composition. Soil differences also exist in the Piedmont province, depending on the character of the parent material and the degree and depth to which it has weathered.

The soils of the county have been grouped into series that have similar characteristics, and the series have been subdivided into soil types according to the texture of the surface soil.

The Cecil, Appling, Durham, and Worsham soils are closely related in occurrence and in the kind of parent material, the underlying rocks being mainly granite, gneiss, and schist. The soils of the Cecil series are characterized either by yellowish-gray or brown to reddish-brown surface soils, and red, stiff, firm clay subsoils. The Durham soils are gray in the surface soil and have yellow or light yellowish-brown moderately friable clay subsoils; the Appling soils are inter-



mediate in color, particularly in the subsoil, between the Cecil and Durham.

Vance and Cataula soils are derived from aplitic granite and coarse-grained granite. They are characterized by coarse sandy loam surface soils and heavy compact subsoils. Vance soils have yellowish-brown subsoils, whereas Cataula soils have red subsoils.

Along the borderline of the Coastal Plain and Piedmont province there is a shallow covering of sandy Coastal Plain material over the red, yellowish-brown, or yellowish clays, which have come from the same parent materials as the Cecil, Appling, and Durham soils. The soils developed under such conditions are the Bradley and Chesterfield; the Bradley has a red clay subsoil resembling that of the Cecil, the Chesterfield is similar in color to the Appling and Durham soils. These soils have about the same agricultural value as the Cecil and Appling soils.

The soils in the part of the county in the Coastal Plain have developed from unconsolidated beds of sand, sandy clay, clay, and gravel. The Red Bay, Orangeburg, Faceville, Bowie, and Gilead soils have sandy surface soils and friable sandy clay or sandy clay loam subsoils, but they differ in color, texture, or consistence. The Bowie soils, which have the greatest acreage in this group, have light-gray to brownish-gray surface soils and pale-yellow to yellowish-brown friable sandy clay loam subsoils. The Gilead soils were separated from the Bowie mainly because of the compact and feebly cemented sandy clay subsoil that immediately underlies the loose sandy surface soil. The Faceville soils have about the same consistence and texture in the surface soil as the Bowie, but they have red sandy clay subsoils. The Red Bay, Orangeburg, Bowie, and Faceville have friable sandy clay substrata, whereas the Gilead material is much heavier in most places.

The Shubuta, Boswell, Susquehanna, and Sawyer soils are underlain by and developed from beds of heavy clay or sandy clay. Rains soil occurs on uplands in slight depressions, flats, and swales. It has formed from acid sands and clays and is poorly drained.

Vaiden soil is similar to Vaiden soils of the Black Belt, as it is weathered from a heavy clay overlying nodular limestone and deposited in a geologic fault as a narrow belt.

Areas of Wickham, Altavista, Augusta, and Roanoke soils occur on second bottoms or high terraces and have developed from old alluvial materials washed from the soil in the Piedmont province. On similar positions in the Coastal Plain there are small areas of Amite, Cahaba, Kalmia, Izagora, Stough, and Myatt soils where the materials have washed from the acid soils of the sandy uplands. In the first bottoms along the streams in the Piedmont province and extending some distance into the Coastal Plain are narrow strips of Congaree and Wehadkee soils. These soils have developed from materials that have been washed from the soils of the Piedmont province and deposited by the streams at times of overflow. Similarly, in the first bottoms along the streams of the Coastal Plain, where the materials have washed from the sandy soils of the upland, are small areas of Mixed alluvial land. The materials forming the Egam soils were transported by the Coosa River from the limestone valley and were redeposited.

The topographic position, parent material, and natural drainage of the soil series are given in table 4.

TABLE 4.—A grouping of the soil series of Elmore County, Ala., showing their topographic position, parent material, and natural drainage

Topographic position and parent material	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained
Coastal Plain uplands: Thick beds of sandy clay loams and sandy loam.	-----	-----	Red Bay	-----	-----	-----
Do	-----	-----	Orangeburg	-----	-----	-----
Do	-----	-----	Faceville	-----	-----	-----
Do	-----	-----	-----	Bowie	-----	-----
Do	-----	-----	-----	-----	Pheba	-----
Thick beds of sands and loamy sands.	-----	Lakeland <sup>1</sup>	-----	-----	-----	-----
Do	-----	-----	-----	-----	-----	Rains.
Thick beds of heavy clays with lenses of friable material.	-----	-----	-----	-----	Susquehanna	-----
Do	-----	-----	-----	Sawyer	Vaiden	-----
Thick beds of heavy clays over calcareous material of Selma chalk.	-----	-----	-----	-----	-----	-----
Thick beds of clays and sandy clays.	-----	-----	Gilead <sup>2</sup>	Shubuta	-----	-----
Do	-----	-----	-----	Boswell <sup>3</sup>	-----	-----
Thick beds of clay	-----	-----	Ducker <sup>4</sup>	-----	-----	-----
Colluvial lands: Recent colluvial materials from Red Bay, Orangeburg, and Faceville soils.	-----	-----	Jamison <sup>4</sup>	-----	-----	-----
Recent colluvial materials from Lakeland, Bowie, and Gilead soils.	-----	-----	-----	-----	-----	-----
Stream terraces or second bottoms: Old alluvium from acid sandy soils of the Coastal Plain.	-----	-----	Amite	-----	-----	-----
Do	-----	Independence	Cahaba	-----	-----	-----
Do	-----	-----	-----	Kalmia	-----	-----
Do	-----	Huckabee <sup>1</sup>	-----	-----	-----	-----
Do	-----	-----	-----	-----	-----	-----





TABLE 4.—A grouping of the soil series of Elmore County, Ala., showing their topographic position, parent material and natural drainage—Continued

Topographic position and parent material	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained
First bottoms: Alluvium from soils underlain by limestone, shale, and fine-textured Coastal Plain material. Recent alluvial materials from acid sandy soils and calcareous material. Recent alluvial materials washed from soils developed over granite, gneiss, and schist. Do-----	-----	-----	-----	Egam-----	Houlka-----	Wehadkee.

<sup>1</sup> Some excessively drained soils are included in this somewhat excessively drained series.

<sup>2</sup> Some somewhat excessively drained soils are included in this well drained series.

<sup>3</sup> Some somewhat poorly drained soils are included in this moderately well drained series.

<sup>4</sup> Some moderately well drained soils are included in this well drained series.

<sup>5</sup> Colluvial material may have contributed partly to the parent material of this poorly drained series.

## DESCRIPTIONS OF THE SOIL UNITS

In the following pages the soils of Elmore County are described in detail and their agricultural relations discussed. Their location and distribution are shown on the accompanying soil map, and their acreage and proportionate extent are given in table 5.

TABLE 5.—*Approximate acreage and proportionate extent<sup>1</sup> of the soils mapped in Elmore County, Ala.*

Soils	Acres	Percent
Altavista fine sandy loam.....	1, 051	0. 3
Amite fine sandy loam.....	1, 391	. 3
Appling sandy loam.....	577	. 1
Augusta silt loam.....	9, 468	2. 3
Bowie sandy loam.....	29, 289	7. 3
Sloping phase.....	1, 277	. 3
Bradley gravelly sandy loam.....	767	. 2
Rolling phase.....	4, 915	1. 2
Cahaba sandy loam.....	1, 447	. 4
Cataula gravelly sandy loam.....	6, 767	1. 7
Rolling phase.....	17, 243	4. 3
Hilly phase.....	2, 733	. 7
Cecil clay loam.....	1, 275	. 3
Rolling phase.....	5, 620	1. 4
Cecil sandy loam.....	201	( <sup>2</sup> )
Chesterfield loamy sand.....	1, 499	. 4
Chesterfield sandy loam.....	4, 118	1. 0
Rolling phase.....	11, 190	2. 8
Congaree silt loam.....	7, 009	1. 7
Congaree fine sandy loam.....	2, 317	. 6
Ducker loam.....	46	( <sup>2</sup> )
Durham sandy loam.....	351	. 1
Egam silt loam.....	1, 143	0. 3
Egam silty clay loam.....	623	. 2
Faceville gravelly sandy loam, thick-surface phase.....	1, 980	. 5
Faceville sandy loam:		
Thick-surface phase.....	11, 665	2. 9
Sloping thick-surface phase.....	1, 637	. 4
Faceville-Bowie gravelly sandy loams:		
Hilly phases.....	11, 451	2. 8
Sloping phases.....	9, 551	2. 4
Gilead sandy loam.....	8, 599	2. 1
Eroded phase.....	3, 035	. 7
Eroded sloping phase.....	10, 585	2. 6
Sloping phase.....	3, 948	1. 0
Helena loamy sand.....	239	. 1
Helena sandy loam.....	790	. 2
Rolling phase.....	1, 437	. 4
Houlka soils.....	43	( <sup>2</sup> )
Huckabee loamy sand.....	1, 694	. 4
Huckabee sand.....	1, 726	. 4
Independence loamy sand.....	1, 326	. 3
Izagora loamy fine sand.....	5, 184	1. 3
Jamison fine sandy loam.....	715	. 2
Kalmia loamy sand.....	3, 223	. 8
Kalmia sandy loam.....	2, 365	. 6
Lakeland sand.....	2, 842	0. 7
Sloping phase.....	4, 581	1. 1

See footnotes at end of table.

TABLE 5.—*Approximate acreage and proportionate extent<sup>1</sup> of the soils mapped in Elmore County, Ala.—Continued*

Soils	Acres	Percent
Lakeland loamy sand:		
Shallow phase.....	2, 618	0. 6
Sloping shallow phase.....	471	. 1
Mixed alluvial land.....	39, 439	9. 8
Myatt loamy sand.....	5, 530	1. 4
Orangeburg fine sandy loam.....	16, 629	4. 1
Eroded phase.....	605	. 2
Eroded sloping phase.....	2, 643	. 6
Orangeburg gravelly fine sandy loam.....	1, 603	. 4
Pheba fine sandy loam.....	750	. 2
Rains loamy sand.....	1, 221	. 3
Red Bay sandy loam.....	3, 854	1. 0
Red Bay fine sandy loam, eroded sloping phase.....	356	. 1
Roanoke silt loam.....	5, 407	1. 3
Rolling and hilly land (Coastal Plain materials).....	24, 437	6. 1
Rough broken land (Cecil soil material).....	39, 529	9. 8
Rough stony land.....	161	( <sup>2</sup> )
Sawyer fine sandy loam.....	382	. 1
Shubuta fine sandy loam.....	838	. 2
Shubuta and Boswell fine sandy loams.....	3, 887	1. 0
Sloping phases.....	6, 410	1. 6
Stough fine sandy loam.....	1, 695	. 4
Susquehanna clay.....	839	. 2
Swamp.....	2, 240	. 5
Vaiden clay.....	249	. 1
Vance coarse loamy sand.....	3, 692	. 9
Vance coarse sandy loam, rolling phase.....	8, 976	2. 2
Vance gravelly sandy loam.....	4, 745	1. 2
Rolling phase.....	6, 574	1. 6
Vance loamy sand.....	818	. 2
Wehadkee silt loam.....	3, 233	. 8
Wickham-Altavista clay loams, eroded sloping phases.....	1, 078	. 3
Wickham fine sandy loam.....	6, 253	1. 6
Low terrace phase.....	3, 487	. 9
Wickham silt loam.....	1, 100	. 3
Worsham sandy loam.....	25	( <sup>2</sup> )
Gravel pit.....	257	. 1
Total.....	402, 964	100. 0

<sup>1</sup> Does not include water areas totaling 18,796 acres.<sup>2</sup> Less than 0.1 percent.

## ALTAVISTA SERIES

The Altavista series has a light-colored surface soil and a yellow or light yellowish-brown firm clay subsoil. It occurs on the level or gently undulating second bottoms or terraces of the Piedmont province and extends into the Coastal Plain in places. It is developed from materials washed from soils in the Piedmont province and deposited by overflowing streams. It is in close association with the Wickham, Augusta, and Roanoke soils but differs from them in color. Drainage is intermediate between the Wickham and Augusta soils.

The soil is deep to very deep (48 to 60 or more inches) to material that is essentially different. Its principal use is for field crops and pasture; under common practices of management, productivity is low for crops and medium for pasture. A considerable increase in productivity can be expected under good management practices.

**Altavista fine sandy loam** (0 to 3 percent slopes) (AA).—This friable moderately well-drained soil on stream terraces has a wide range of suitability for crops, but many areas are subject to overflow during extremely high water. It is associated on the stream terraces with the reddish well-drained Wickham soils, the dark grayish-brown somewhat poorly drained Augusta soil, and the grayish poorly drained Roanoke soil. Surface runoff is slow to medium and internal drainage is medium.

Profile characteristics:

Surface soil—

0 to 6 inches, light-gray to gray friable fine sandy loam; weak fine granular structure; small quantity of organic matter.

6 to 12 inches, light brownish-gray friable fine sandy loam; essentially structureless.

Subsoil—

12 to 30 inches, yellow or light yellowish-brown firm stiff smooth clay; moderate medium blocky structure; some small scales of mica; small number of distinct medium gray or brown mottles or color patches at 18 to 20 inches in some locations.

Underlying material—

30 inches +, firm smooth clay distinctly mottled yellow, gray, and brown; contains some mica; may grade into more friable material containing mica and fine sand at 4 or 5 feet or may continue as firm clay to a depth of several feet.

The soil is strongly acid, low to fair in organic matter, and medium to low in fertility. It is moderately to rapidly permeable in the surface soil and moderately to slowly permeable in the subsoil. Water-holding capacity is moderate to high.

Iron concretions in the lower subsoil in many locations tend to make the soil more friable and slightly more productive. Locally small areas of Wickham fine sandy loam and Augusta silt loam are included with this soil.

*Use and management.*—A good livestock program on this soil is one developed around the production of oats, sorghum, and pasture. The soil is well adapted to the production of oats, and its relief permits the use of tractor and combine for harvesting the crop. Lespedeza, following the oats, makes good pasture. Fair to good yields of cotton and corn, an excellent quality of sorghum, and good yields of sorghum

ensilage may be produced under good management. Boll weevils, which hibernate in fields and woods, generally cause severe damage to cotton on this soil, especially since it warms up somewhat late in spring.

#### AMITE SERIES

The soil of the Amite series is the yellowish-red to brown well-drained soil occurring on terraces along the larger streams of the county. It has developed from materials washed from soils of the Coastal Plain, and in places there may be a slight admixture of material from the soils of the Piedmont province and Appalachian Mountains region. It occurs in association with the Cahaba and to some extent with Wickham soils.

This is a deep to very deep soil. It is used principally for field crops; productivity is medium for most crops but is relatively high for cotton. The soil responds well and reaches a much higher level of productivity under good management.

**Amite fine sandy loam** (0 to 3 percent slopes) (AB).—This soil is similar to Red Bay sandy loam but is somewhat finer textured. It occurs on benchlike or terrace positions of a few to as much as 80 feet above overflow of the streams, whereas the Red Bay soil occurs 50 to 150 feet above the Amite soil on ridges and plateaulike positions surrounded by steep slopes or escarpments. The relief is nearly level or gently undulating. Surface runoff is slow, and internal drainage is medium. Terraces are seldom needed except along the slight escarpments. Sand and gravel underlying the soil at 4 to 8 feet aid good drainage.

#### Profile description:

##### Surface soil—

0 to 7 inches, yellowish-red to brown very friable fine sandy loam or loose loamy fine sand; structureless.

##### Subsoil—

7 to 36 inches, red friable fine sandy clay loam; moderate medium blocky structure.

36 to 50 inches, yellowish-red friable fine sandy clay or fine sandy clay loam; moderate medium blocky structure; some fine distinct gray mottles in places.

##### Underlying material—

50 to 80 inches, yellowish-red friable fine sandy clay or fine sandy clay loam; many fine distinct yellow mottles.

80 inches +, reddish-yellow loamy fine sand containing small rounded water-worn quartz gravel in many places.

The soil varies slightly in color, and the thickness of the surface soil ranges from 6 to 18 inches. In some locations the subsoil is somewhat finer textured than that described in the profile.

This soil is medium to strongly acid in the surface soil and subsoil. It has a medium supply of organic matter and a medium to high fertility level. Permeability in the surface soil is moderately rapid and in the subsoil moderate. The water-holding capacity is moderate to high.

Small areas of Amite loamy fine sand are included with this soil as mapped.

*Use and management.*—Amite fine sandy loam is one of the most desirable agricultural soils in the county. Approximately 96 percent is used for crops. It can be farmed under a wide variety of soil conditions, is well suited to all locally grown crops, warms up early in

spring, has good moisture conditions, and is well drained, even though practically level. It lies favorably for the use of power machinery and farm equipment. The generally good management of this soil, coupled with its good qualities, promotes good to excellent yields.

#### APPLING SERIES

The soil of the Appling series has a light-gray or light brownish-gray sandy surface soil and a yellowish-brown to reddish-yellow firm clay subsoil. The subsoil is intermediate in color between the red subsoils of the Cecil and the yellow of the Durham. This well-drained soil has developed from the weathered products of granite and gneiss of the Piedmont province, and occurs on undulating to gently sloping relief.

The Appling soil is deep (36 to 60 inches). It is principally used for field crops, pasture, and forest. Productivity for crops is low to medium, but much improvement can be obtained by the use of good soil-management practices.

**Appling sandy loam** (2 to 7 percent slopes) (Ac).—This soil occurs in close association with Cecil and Durham soils. Surface runoff is slow to medium, and internal drainage is medium. The somewhat billowy areas require crooked terraces for erosion control. The control of erosion is an important consideration, particularly on the stronger slopes.

##### Profile description:

##### Surface soil—

0 to 7 inches, light-gray or light brownish-gray friable sandy loam or loamy sand; weak fine granular structure; small quantity of organic matter.

7 to 10 inches, light brownish-gray friable sandy loam; essentially structureless.

##### Subsoil—

10 to 30 inches, yellowish-brown to reddish-yellow firm, heavy clay; moderate medium blocky structure; some distinct red, brown, and yellow medium to coarse mottles in the lower part.

##### Parent material—

30 inches +, similar to the lower part of the above layer but slightly more compact or brittle and grading into partly weathered granite and granite schist between 36 and 50 inches.

The thickness of the surface soil varies with the degree of erosion. In some locations it is as much as 12 inches; in others the surface soil is almost completely removed, exposing the underlying heavy yellowish-brown subsoil.

The soil is strongly acid. It has a low to fair content of organic matter and is low to medium in fertility. Permeability is moderately rapid in the surface soil and moderate in the subsoil. Water-holding capacity is moderate.

*Use and management.*—About 57 percent of Appling sandy loam is open land used mostly for intertilled crops and pasture. The normal yields of the principal crops are only fair. Yields can be greatly improved by using 300 to 400 pounds of a high grade fertilizer on cotton and a side application of about 200 pounds of nitrate of soda on corn. To improve the somewhat droughty condition of this soil, liberal quantities of organic matter should be turned under and plowing should be deep.



Kudzu may be advantageously used for erosion control, as a hay crop, or for temporary pasture, especially on the critical slopes. It is slow to get established unless liberal applications of manure or compost are used.

Forested areas are largely in old-field pine, post oak, sweetgum, and some hickory, white oak, poplar, and dogwood.

#### AUGUSTA SERIES

The soil of the Augusta series occurs on stream terraces in the Piedmont province. It extends locally along the larger streams from the Piedmont into the Coastal Plain. It has formed from sediments washed predominantly from the soils in the Piedmont province, but where it extends into the Coastal Plain, local sediments are mixed with the Piedmont material. The Augusta soil is somewhat poorly drained. It is closely associated with and related to the Wickham, Altavista, and Roanoke soils. It is not so well drained as the Altavista but much better drained than the Roanoke.

The soil is deep. It is used mostly for field crops and pasture. Under common management productivity is usually low for field crops but medium for pasture. Substantial improvement in productivity for crops from good soil management, including adequate drainage, can be expected. Productivity for pasture can be improved by suitable management, including proper fertilization.

**Augusta silt loam** (0 to 2 percent slopes) (Ad).—This soil occurs in small to relatively large bodies on the stream terraces along the Tallapoosa and Coosa Rivers. Relief is nearly level. Surface runoff is slow and internal drainage is medium to slow. This soil is subject to overflow and silt is generally deposited during periods of extremely high water.

#### Profile characteristics:

##### Surface soil—

0 to 6 inches, dark grayish-brown to brown friable silt loam; weak medium to fine crumb structure; a fair quantity of organic matter; rounded iron concretions generally present.

##### Subsoil—

6 to 18 inches, yellowish-brown or light yellowish-brown friable silty clay loam; weak medium blocky structure; locally a small number of faint fine pale-yellow mottles and a few soft iron concretions.

18 to 30 inches, light yellowish-brown firm heavy silty clay; many distinct medium mottles of light gray and yellowish brown; moderate medium blocky or massive structure.

##### Underlying material—

30 inches +, firm silty clay or silty clay loam distinctly mottled light yellowish brown, dark grayish brown, reddish yellow, and very pale brown.

As this soil grades toward the Roanoke soil, it is grayer and not so well drained. In most locations soft iron concretions are concentrated on the surface and in the subsoil. The texture of the subsoil ranges from heavy silt loam to silty clay, and the consistence ranges from friable to firm.

Reaction is strongly acid. The soil is low to medium in fertility and has a moderate to moderately low water-holding capacity. The surface soil is moderately permeable and the subsoil is slowly permeable.

*Use and management.*—Most areas of Augusta silt loam have been cleared of the original hardwood growth, but artificial drainage is necessary for successful crop production. Probably 40 to 50 percent is used for pasture, which requires less drainage than areas used for tilled crops. Most of the rest is used for corn, oats, sorghums, cowpeas, velvetbeans, soybeans, and to a small extent for cotton.

The soil dries slowly in spring, but it responds satisfactorily to good management and fertilization. Higher yields depend on the cultural practices and quantity of fertilizer applied. A liberal application of dolomitic limestone, phosphate, and potash is needed for most legume crops and pastures. Applications of phosphate or basic slag to pasture areas will improve the principal forage plants (carpetgrass, Dallisgrass, and lespedeza) and make it possible to introduce white Dutch clover (fig. 2).



FIGURE 2.—White Dutch clover on Augusta silt loam south of Wetumpka.

**BOWIE SERIES**

The soils of the Bowie series (included in the Norfolk series in older soil surveys) are characterized by light-gray or very pale-brown surface soils and pale-yellow to yellowish-brown upper subsoils. They are yellow or yellowish brown mottled with red in the lower subsoil. The Bowie soils are slightly heavier in the lower subsoil than the similarly colored Norfolk soils that are commonly found on much of the Coastal Plain. They have developed from unconsolidated beds of acid sandy clay on gently undulating to gently rolling uplands. They occur in association with Pheba, Faceville, Orangeburg, and Red Bay soils. They have nearly level to sloping or rolling relief and are moderately well drained.

The Bowie soils are deep. They are used principally for field crops, but some areas are in garden and truck crops and some in forest. Under common management, productivity for field crops is medium to low. The productivity level can be raised considerably by good soil management.

**Bowie sandy loam** (0 to 5 percent slopes) (BA).—This extensive soil is one of the best agricultural soils in the county. It has nearly level to gently sloping relief. Surface runoff is slow to medium, and the hazard of erosion is slight to moderate. Large farm machinery can be used satisfactorily. The leaching, or washing out, by the winter rains of soluble plant nutrients is the greatest handicap of this soil. However, it does not leach so rapidly as Lakeland loamy sand or Lakeland sand.

**Profile characteristics:****Surface soil—**

0 to 8 inches, light-gray to very pale-brown loose sandy loam; weak fine granular structure.

8 to 14 inches, very pale-brown friable sandy loam; essentially no structure.

**Subsoil—**

14 to 24 inches, pale-yellow friable sandy clay loam with faint mottling in lower part; weak medium blocky or massive structure.

24 to 40 inches, yellow or yellowish-brown friable heavy sandy clay loam or light sandy clay; some red distinct medium mottles; moderate to weak medium blocky structure.

**Parent material—**

40 inches +, friable sandy clay colored with distinct medium to coarse mottles of red, pale yellow, and white to light gray; the white to gray color increases with depth.

The soil is strongly acid, contains a fair quantity of organic matter, and has low to medium fertility. Permeability is moderately rapid in the surface soil and moderate in the subsoil. The soil has a moderate to high water-holding capacity.

In many places the surface soil is fine sandy loam. In the vicinity of Deatsville a noticeable quantity of small rounded quartz gravel occurs on the surface and mixed with the soil.

*Use and management.*—Bowie sandy loam is suited to a wide variety of crops; about 86 percent of it is cultivated. It is especially well suited to corn (fig. 3), oats, cotton, and hay (fig. 4, A and B). It is responsive to good management and can be tilled with a minimum of power. Erosion is not a serious problem. Commercial fertilizer is applied on cotton and to a less extent on other crops. Corn and oats are given a topdressing of nitrate of soda.





FIGURE 3.—Corn on Bowie sandy loam following Kobe lespedeza.

**Bowie sandy loam, sloping phase** (6 to 12 percent slopes) (Bb).—This phase differs from the normal phase in that it has more sloping to rolling relief, more severe erosion, and usually lower water-holding capacity. Productivity for crops is a little lower, and conservation practices are more difficult. It is mainly in the northwestern part of the county, but small scattered areas occur in the central and southwestern parts. The soil is strongly acid.

Profile characteristics:

Surface soil—

- 0 to 5 inches, grayish-brown to light brownish-gray very friable sandy loam of weak fine granular structure; small quantity of organic matter.
- 5 to 12 inches, very pale-brown to pale-yellow friable sandy loam; essentially structureless.

Subsoil—

- 12 to 22 inches, yellow or yellowish-brown friable sandy clay; some fine faint red mottles in lower part; weak medium blocky or massive structure.
- 22 to 50 inches, yellow friable sandy clay loam or sandy clay; few to many red distinct medium mottles; moderate to weak medium blocky structure.

Parent material—

- 50 inches +, distinctly mottled red, pale-yellow, and white friable sandy clay; plastic when wet; becomes more gray and less red and yellow with increasing depth.



FIGURE 4.—*A*, Cotton on Bowie sandy loam 2 miles west of Kent; land in foreground prepared for oats or alfalfa. *B*, Cows grazing alfalfa on Bowie sandy loam on Draper Prison Farm at Speigner.

Eroded spots of less than one-quarter acre up to several acres that have lost all or part of the surface soil through sheet erosion are present. These eroded areas are less productive and do not have such good moisture conditions nor so much organic matter as the uneroded soil. Permanent cover crops and trees are needed unless erosion can be stopped. Rounded pebbles, present in a few areas, do not interfere seriously with cultivation; by providing better aeration, they cause cotton to develop more quickly.

*Use and management.*—Most areas of the sloping phase of Bowie sandy loam can be terraced and conserved by careful management. The slopes are relatively uniform and require gently curving terraces. Well-constructed terraces are sufficient in most locations, but permanent cover crops, such as kudzu or sericea lespedeza, are required on some of the steeper slopes.

The productive capacity and utilization of this soil depend upon the care it has received. Where careful management has been practiced and terraces have been maintained, the soil is responsive to good man-

agement, productive, fairly easily tilled, and retentive of moisture for growing crops. In addition it has wide crop suitabilities. Most of the commonly grown crops of the region may be produced satisfactorily; yields are fair to good under good management.

About 68 percent of this soil is cleared, and the rest is in forest of old-field and shortleaf pines, post, blackjack, and red oaks, sweetgum, and hickory. Cotton, corn, cowpeas, soybeans, lespedeza, sorghum, and some truck and garden crops are the principal tilled crops. Liberal applications of fertilizer are needed for best crop production. Kudzu or sericea lespedeza, which may be used for temporary pasture or harvested for hay, can be grown advantageously on the steep areas. Liberal applications of either basic slag or superphosphate and lime are needed for best results.

#### BRADLEY SERIES

The soils of the Bradley series are characterized by gray or dark-gray to yellowish-brown sandy surface soils and red or yellowish-red firm but brittle clay subsoils. They occur in association with the Chesterfield soils along the border of the Piedmont province and Coastal Plain. They are somewhat similar to the Cecil soils, differing mainly in having surface soils composed of sandy water-laid material that was deposited over clays developed from weathered products of granite, gneiss, and schist. This series differs from the Chesterfield in having red or yellowish-red clay subsoils; those of the Chesterfield are brownish yellow or pale yellow to yellowish brown. The relief is undulating to rolling or sloping.

The Bradley soils are deep. They are used largely for field crops, pasture, and forest; productivity for the field crops is medium to low under common management. A considerable increase in productivity can be expected under good soil management.

**Bradley gravelly sandy loam** (2 to 6 percent slopes) (Bc).—Areas of this soil are relatively small and occur in the northern and northeastern parts of the county in close association with Chesterfield soils. They are usually on long irregularly shaped ridgetops, on tip ends of ridges, and on slopes adjacent to streams. Relief is undulating to sloping. Surface runoff is slow to medium; internal drainage, medium. Since fields of this soil are sloping, irregularly shaped, and underlain by subsoils relatively slow in water-absorbing capacity, they are subject to erosion unless terraces and good management practices are used. The shapes of the fields and the use of terraces handicap the use of large machinery. The sandy surface soil consists of overlapping Coastal Plain deposits, whereas the subsoil is derived from weathered products of underlying rocks of the Piedmont province.

#### Profile description:

##### Surface soil—

0 to 6 inches, gray to dark-gray very friable sandy loam; a large quantity of small rounded quartz gravel in the layer and on the surface; weak fine granular structure.

6 to 10 inches, grayish-brown to yellowish-brown friable sandy loam or sandy clay; moderate medium granular to fine blocky structure.

##### Subsoil—

10 to 40 inches, red or yellowish-red firm but brittle clay; strong medium blocky structure.

##### Underlying material—

40 inches +, disintegrated granite and schist; depth to this material ranges from 40 to 60 inches.



Both the surface soil and subsoil are strongly acid. The soil has a fair to medium organic-matter content, medium fertility, and moderate water-holding capacity. Permeability of the surface soil is rapid, and of the subsoil, moderate.

*Use and management.*—Approximately 70 percent of Bradley gravelly sandy loam is cleared; the rest is in old-field and shortleaf pines, red and post oaks, sweetgum, and hickory. Not all of the cleared areas are farmed—many are idle and support such native plants as broomsedge, lespedeza, old-field pines, briars, and sweetgums; others are mutilated by erosion.

The principal crops—cotton, corn, oats, and soybeans—give fair yields. Deep plowing and the incorporation of organic matter have improved several of the areas so that they give good yields. This practice seems important for the most economical utilization of the soil. Many farmers plant kudzu or sericea lespedeza for erosion control and temporary pasture or hay, particularly on the more sloping areas.

**Bradley gravelly sandy loam, rolling phase (7 to 12 percent slopes) (B<sub>D</sub>).**—This soil is more severely eroded and has a smaller percentage open for cultivation than the normal phase. It is usually a little lower in organic matter and fertility. The most extensive areas are located in the northern and northwestern parts of the county, but scattered areas are in the central and eastern parts. Because of the rolling relief and the relatively slow absorption of water by the subsoil, this soil is subject to serious sheet and gully erosion under clean-cultivated crops unless careful soil-conserving practices are used. The surface soil is sandy, being derived from Coastal Plain materials, whereas the clayey subsoil is derived from rocks of the Piedmont province.

**Profile characteristics:**

**Surface soil—**

- 0 to 6 inches, gray to dark-gray friable sandy loam; a large quantity of rounded quartz gravel in the layer and on the surface; weak fine granular structure.
- 6 to 9 inches, grayish-brown to dark-gray friable sandy loam or sandy clay; moderate medium granular to fine blocky structure.

**Subsoil—**

- 9 to 36 inches, red or yellowish-red firm but brittle clay; strong medium blocky structure.

**Underlying material—**

- 36 inches +, disintegrated granite and schist; this material underlies the subsoil at depths of 36 to 40 inches.

*Use and management.*—Approximately 27 percent of the rolling phase of Bradley gravelly sandy loam is cleared; the rest is in forest. The forest areas grow largely old-field and shortleaf pines, post oak, sweetgum, hickory, and some poplar. Most of these areas have been cut over and now support second-growth forest. About one-half of the cleared land is used annually for crops, and the rest is in pasture or idle. Many of the idle areas are gradually restocking to old-field pines. The pasture areas are largely lespedeza, carpetgrass, and Dallisgrass, and little effort has been made to improve them. Cotton, corn, oats, and soybeans are the principal crops. Yields are relatively low except on a few select spots.



As this soil is subject to serious erosion when in row crops, it is used by many farmers for kudzu or sericea lespedeza for hay or temporary pasture.

#### CAHABA SERIES

The surface layer of the soil of this series is dark reddish brown or dark gray, and the subsoil is yellowish red. The soil occurs on terraces along the larger streams and lies well above ordinary overflows. It has nearly level relief and is well drained. The material from which it was derived was washed principally from the upland soils of the Coastal Plain.

The soil is deep and is mostly in field crops. Under common management, productivity is medium for most crops but relatively high for cotton. Productivity for all crops can be increased by good soil management practices.

**Cahaba sandy loam** (0 to 2 percent slopes) (CA).—This soil is similar to Faceville sandy loam, thick-surface phase, of the upland, but it is associated with Kalmia, Amite, and Wickham soils of the stream terraces. It is intermediate in color and development between the Kalmia and Amite soils, and although similar in color to the Wickham it has a much looser and more friable subsoil. Surface runoff is slow and internal drainage is medium.

##### Profile characteristics:

##### Surface soil—

- 0 to 10 inches, dark reddish-brown friable sandy loam or loose loamy sand; noticeable quantity of organic matter; weak fine granular structure.
- 10 to 18 inches, reddish-brown friable sandy loam; essentially no structure.

##### Subsoil—

- 18 to 36 inches, yellowish-red friable sandy clay or sandy clay loam; weak fine to medium blocky structure.

##### Underlying material—

- 36 inches +, red friable sandy clay loam, grading in many places into fine sand and gravel at a depth of 40 to 50 inches.

Most of the areas of this soil occur close to the rivers and have a fine sandy loam surface soil.

The soil is strongly acid throughout. It has medium to high fertility and moderate to high water-holding capacity. Permeability is moderately rapid in the surface soil and moderate in the subsoil.

*Use and management.*—Cahaba sandy loam is an excellent agricultural soil, and about 92 percent is under cultivation. It is well suited to and used for general farm crops, including cotton, corn, oats, and hay. Response to management is good, tillage is easy, and erosion is not a problem. Farm machinery can be used satisfactorily, and farming can be done under a wide range of moisture conditions.

#### CATAULA SERIES

The soils of the Cataula series (formerly included in the Cecil series) have dark-brown to light brownish-gray sandy surface soils and red very firm or firm compact clay subsoils. The soils are developed from the weathered products of aplitic granite, other granite, and gneiss that are perhaps influenced to some extent by basic rocks. These soils are associated with Vance soils, which have reddish-yellow subsoils. They are somewhat similar to Cecil soils but differ in having firmer and tougher upper subsoils and a slightly darker red color.

They occur on undulating, rolling, and hilly relief and are more erosive than the Cecil soils on the same relief and under similar management. They are well to moderately well drained. Scattered over the surface and mixed with the soil is a large quantity of angular quartz fragments ranging in diameter from  $\frac{1}{2}$  to 5 or more inches.

These soils are deep. They are principally in forest, range land, and field crops; some parts are in pasture or lying idle. Productivity for crops is medium to low under common management. It can be increased considerably on most of the soils by improved soil management.

**Cataula gravelly sandy loam** (0 to 6 percent slopes) (CB).—This soil is like Cecil sandy loam in appearance, but it is heavier in the upper subsoil and is derived from coarse-grained granite or aplitic granite. It differs from Vance gravelly sandy loam mainly in color of the subsoil. It generally occurs in the northern part of the county in long narrow irregularly shaped areas on ridgetops having nearly level to undulating relief. Surface runoff is slow to rapid, and erosion hazard is slight to high. Internal drainage is slow.

**Profile description:**

**Surface soil—**

0 to 5 inches, dark-brown to light brownish-gray friable sandy loam; weak fine granular structure; many small angular quartz fragments on the surface and mixed with the soil.

**Subsoil—**

5 to 18 inches, red very firm tough slightly compact clay; very strong medium blocky structure; sticky when wet and very hard when dry.

18 to 48 inches, red firm clay, locally streaked with light brownish gray; strong medium blocky structure.

**Parent material—**

48 inches +, red disintegrated and partly decomposed granite, gneiss, and aplitic granite.

The soil varies considerably in depth, color, degree of erosion, and texture, but it has the same agricultural uses throughout. Some soils are derived from coarse-grained granite, others from granite gneiss. Some areas in the northwestern and north-central parts of the county, in the vicinity of Buyck, are practically free of angular quartz fragments.

The supply of organic matter is fair. The soil is strongly acid and has medium fertility and a moderate to moderately low water-holding capacity. Permeability is rapid in the surface soil and slow in the subsoil.

**Use and management.**—Approximately 64 percent of Cataula gravelly sandy loam is cleared, but less than 35 percent is tilled. Many idle areas grow sedgegrass, briers, and small pines. The forests are composed largely of old-field pine, post and red oaks, sweetgum, hickory, and some poplar.

The crops most commonly grown—cotton, corn, oats, and legume hay—give fair yields under good management. A few well-managed areas are producing excellent yields. Cotton and oats are possibly best suited.

A few fields have gentle uniform slopes, are carefully terraced, and produce good crops. Some terraced fields are small, and short crooked rows are necessary. Most fields have not been terraced, however, as construction and maintenance are difficult. Crooked terraces are

required; sloping topography and slowly pervious subsoil make runoff rapid on the stronger slopes.

Since this soil requires careful management practices to conserve it and maintain its productivity, more attention is being given to erosion-control and soil-building crops grown with the clean-cultivated crops. Kudzu or sericea lespedeza is being used on some of the rolling areas for erosion control and as a hay or temporary pasture crop.

**Cataula gravelly sandy loam, rolling phase** (7 to 12 percent slopes) (Cd).—This phase differs from the normal phase in being more rolling and more eroded. It is heavier and more compact in the upper subsoil than the Cecil soils, as well as a little more erosive on some slopes under similar management. This soil is strongly acid. The rolling complex slopes of 7 to 12 percent make terraces difficult to construct and maintain. If this soil is used for row crops, erosion is extreme because of the sloping relief and the slow water absorption of the heavy subsoil. The largest and most extensive areas of this phase are in the northern and northeastern parts of the county.

Profile characteristics:

Surface soil—

0 to 5 inches, dark-brown to light brownish-gray friable sandy loam containing many angular quartz fragments varying in size from  $\frac{1}{2}$  to 5 inches; weak fine granular structure.

Subsoil—

5 to 15 inches, red very firm smooth compact clay; very strong medium blocky structure.

15 to 45 inches, red firm smooth slightly compact clay, streaked with yellow; strong medium blocky structure.

Parent material—

45 inches +, red disintegrated and partly disintegrated and partly decomposed granite or gneiss.

Most areas have angular quartz gravel on and in the surface soil, but many others are gravel free.

*Use and management.*—Approximately 84 percent of the rolling phase of Cataula gravelly sandy loam is in forests of old-field and shortleaf pines, hickory, sweetgum, and post oak. The rest is idle land, pastureland, and cropland; more than 50 percent is idle. A small percentage is used for row crops, and a part is used for kudzu or sericea lespedeza that furnish temporary grazing or hay and also serve as a soil-conserving crop.

The cleared areas are irregular in shape and small, seldom exceeding 4 acres. The less sloping and less eroded areas are farmed, and fair yields are obtained under good management.

An application of 200 to 300 pounds of 6-8-4<sup>4</sup> fertilizer or its equivalent is generally used for cotton, and 100 to 150 pounds of nitrate of soda an acre is used for corn. Some farmers use a small quantity of basic slag or superphosphate for soybeans.

**Cataula gravelly sandy loam, hilly phase** (13 to 30 percent slopes) (Cc).—This soil differs from the normal phase in that it is more broken and hilly, much more eroded, and less extensively cultivated. It is not uniform in depth over rock and ranges in texture from coarse

<sup>4</sup> Percentages, respectively, of nitrogen, phosphoric acid, and potash.

sandy loam to sandy loam. In color, consistence, and texture of the subsoil it ranges from yellow, mottled with red, firm compact sandy clay to red very firm stiff compact clay. The most consistent characteristic is its steeply sloping relief. Most areas have many quartz fragments on the surface that range from 1 to 8 inches in diameter. This phase is distributed over most of the northern and northeastern parts of the county. It is fair to low in organic matter, medium to low in fertility, and moderately low in water-holding capacity.

*Use and management.*—Approximately 3 percent of Cataula gravelly sandy loam, hilly phase, is cleared of timber and is being used for pasture. Lespedeza grows on the pasture areas without special management practices, but grazing is confined to spring and early fall. Growing kudzu or sericea lespedeza for erosion control and temporary grazing is possibly one of the best ways of utilizing this soil.

The soil is useful for forest, for which most of it is now used. Adequate measures to prevent fires are practically the only requisites necessary for reestablishment of good loblolly and shortleaf (rosemary) pine forest cover in those areas where enough seed trees remain. This land is also suitable for game preserves, as enough underbrush and cane grow along the streams to support deer; and there are enough nuts, beggarweeds, mast, native vetch, native lespedeza, French mulberry, dogwood, and other seeds for the feeding of quail and turkeys.

#### CECIL SERIES

The soils of the Cecil series are some of the most widely distributed soils in the southern Piedmont province. In this county they have light-gray or light brownish-gray sandy loam or weak-red or reddish-brown clay loam surface soils and red or light-red firm brittle clay subsoils. They are developed from products of granite, gneiss, and mica schist rocks that in places have weathered thoroughly or disintegrated to depths of 6 to 20 or more feet. The surface relief ranges from undulating or gently sloping on the broader stream divides to steeply sloping or strongly rolling on areas bordering drainageways. Even though the soils are well drained, both sheet and gully erosion are severe on the more sloping and rolling areas that have been in clean cultivation for several years.

The soils are deep to very deep (36 to 60 or more inches). They are mainly in field crops and forest. Productivity of the crops is low to medium under prevailing management but can be improved considerably in most areas by good management.

**Cecil clay loam** (2 to 7 percent slopes) (C<sub>ε</sub>).—This soil occurs as relatively small irregularly shaped areas in the northern part of the county. Many of the areas are less than 5 acres in size, and very few exceed 40 or 50 acres. The largest areas occur in the vicinity of Seaman. The soil occupies ridgetops on undulating to sloping relief. Surface runoff and internal drainage are medium. Erosion hazard is medium to high because of the sloping relief and the relatively slow water absorption in the subsoil. Before erosion became so active, this red clay or clay loam soil had a sandy loam surface. In many areas the texture of the surface soil is sandy clay loam.

**Profile characteristics:****Surface soil—**

0 to 5 inches, weak-red to reddish-brown friable clay loam or sandy clay loam; moderate medium granular structure.

5 to 8 inches, yellowish-red or light-red friable clay loam; moderate medium blocky structure.

**Subsoil—**

8 to 40 inches, red firm slightly compact but brittle clay; strong medium blocky structure; hard when dry, sticky and plastic when wet.

**Parent material—**

40 to 50 inches, red friable clay faintly mottled or streaked with yellow and containing a large quantity of small mica flakes that give it a slick feel when rubbed between the fingers; grades into disintegrated granite or gneiss at 50 to 60 inches.

Angular quartz fragments occur on many areas but they do not seriously interfere with cultivation or crop yields.

This soil is strongly acid throughout the profile. It has a fair organic-matter content, medium fertility, and a moderate to moderately low water-holding capacity. The surface soil and subsoil are moderately permeable.

*Use and management.*—Approximately 64 percent of Cecil clay loam is open for cultivation. The rest is in forest of old-field and shortleaf pines, hickory, red and post oaks, and some poplar. All the virgin timber has been removed. Most areas have at one time been in cultivation, although about one-third of them are now in second-growth timber.

Cotton, corn, oats, and hay are the major crops, and relatively high yields can be obtained under good management. Unless large quantities of legume crops are turned under by deep plowing, this soil tends to be droughty for the production of corn.

The soil is well suited to white Dutch clover, Dallisgrass, orchard-grass, lespedeza, and other pasture grasses, but phosphatic fertilizers and lime or basic slag are necessary for their best growth. Moisture is a limiting factor for pasture during summer months, and terracing and contour plowing are beneficial.

Tests by the experiment station and by farmers show that this soil is especially well suited to kudzu and sericea lespedeza production. These crops are used for erosion control and for temporary pasture or hay.

**Cecil clay loam, rolling phase** (8 to 15 percent slopes) (Cr).—This phase, scattered in the north-central part of the county, differs from the normal phase in having more rolling topography and more erosion. Erosion has removed most of the original sandy loam material, and the soil is now a clay loam. The surface soil is a 4- to 6-inch layer of weak-red to reddish-brown friable clay loam over a firm, slightly compact red clay subsoil. Disintegrated granite rocks are present 3 to 4 feet beneath the surface.

This phase is variable in character. Small areas of Cecil sandy loam, rolling phase, having better moisture conditions than the clay loam, are included, but the management requirements are about the same.

*Use and management.*—The largest percentage of Cecil clay loam, rolling phase, is in timber. About 29 percent is cleared for the cultivation of general farm crops, particularly cotton, corn, hay, and oats.



Yields are relatively low. Only the less sloping areas of the cleared land should be in the clean-tilled crops; the more sloping to rolling areas should be planted to kudzu or sericea lespedeza for pasture or hay crops. The forested areas grow principally old-field and short-leaf pines, various species of oak, and poplar.

**Cecil sandy loam** (2 to 7 percent slopes) (Cg).—This soil is the less eroded member of the Cecil series. It occurs on gently rolling or billowy relief. Surface runoff is medium, and hazard of erosion is moderate to high. Internal drainage is medium.

Profile characteristics:

Surface soil—

0 to 7 inches, light-gray to light brownish-gray friable sandy loam; weak fine granular structure.

7 to 12 inches, yellowish-red friable sandy loam or sandy clay loam; moderate medium granular structure.

Subsoil—

12 to 40 inches, light-red or red firm slightly compact clay; strong medium blocky structure.

Parent material—

40 inches +, light-red to yellowish-red friable clay, faintly mottled with yellow and containing small scales of mica; grades into or rests upon disintegrated granite at 5 to 7 feet.

Erosion has been active on areas of this soil. In many locations all surface soil has been removed, exposing the red clay subsoil. Angular quartz fragments, present on many areas, do not seriously interfere with cultivation.

All layers of the profile are strongly acid. The soil has a fair supply of organic matter and a moderate water-holding capacity. Permeability is moderately rapid in the surface soil and moderate in the subsoil.

*Use and management.*—Cecil sandy loam is a fairly fertile soil and responds satisfactorily to good management practices. About 76 percent of it is cultivated, especially to cotton and oats. Relatively high yields of corn and hay crops can be obtained under proper management, which includes the turning under of cover crops. Kudzu and sericea lespedeza are especially well suited to this soil as permanent hay crops.

Rolling relief makes this soil subject to serious erosion unless terracing, soil-conserving crops, or other soil-conserving measures are used. Usually the fields are irregularly shaped; they occur as knobs or knolls that necessitate short crooked terraces.

#### CHESTERFIELD SERIES

The soils of the Chesterfield series have pale-brown to light brownish-gray sandy surface soils and brownish-yellow or pale-yellow to yellowish-brown firm sandy clay or clay subsoils with some red and brown mottles in the lower part. The surface soils vary in depth and are derived from deposits of water-laid sandy materials similar to those of the Bowie soils. The subsoils are developed from weathered products of granite, gneiss, and mica schist of the Piedmont province. The soils of this series occur along the contact line of the Coastal Plain and Piedmont province in Elmore County. They range in relief from nearly level to sloping or rolling and are moderately well drained.



The Chesterfield soils are moderately deep to very deep (about 30 to more than 60 inches). They are used mainly for field crops, pasture, and forest. Some areas are lying idle. Productivity of crops and pasture is low to medium under common management. Much improvement is possible if suitable management is practiced.

**Chesterfield loamy sand** (1 to 6 percent slopes) (Ck).—This soil is intermediate between Bowie sandy loam and Chesterfield sandy loam. It differs from the Bowie in having some angular quartz fragments on the surface and a heavier more compacted lower subsoil, and from Chesterfield sandy loam in having a much deeper and coarser textured surface soil. Its productivity and management requirements are most like those of Bowie sandy loam. Its topography is also similar (gently undulating to gently sloping relief). Surface runoff is slow to medium, and erosion hazard is slight to moderate. Internal drainage is medium. Even though the fields are terraced, most areas can be farmed satisfactorily with large machinery, as many of the fields have simple and uniform slopes.

Although the soil is variable from place to place, the most common profile characteristics are as follows:

Surface soil—

0 to 6 inches, pale-brown very friable loamy sand; fair quantity of organic matter; weak fine granular structure.

6 to 10 inches, light brownish-gray friable sandy loam or loose sandy loam; essentially no structure.

Subsoil—

10 to 20 inches, pale-yellow friable sandy clay; weak medium blocky structure.

20 to 60 inches, yellow to yellowish-brown firm compact heavy sandy clay, mottled or splotted with red and brown; moderate medium blocky structure.

Underlying material—

60 inches +, weathered granite; depth of subsoil to this layer varies considerably, ranging from 5 to 8 feet.

Reaction is strongly acid throughout the profile. The soil has low to medium fertility. Permeability in the surface soil is moderately rapid and in the subsoil moderate.

This soil is so closely associated with the Bowie soils that a few small areas of Bowie sandy loam are included. These areas have similar agricultural use.

*Use and management.*—As Chesterfield loamy sand is desirable for agriculture, 89 percent of it is cleared. Fields are small and irregular in shape. Cotton, corn, and hay occupy the largest acreage, and relatively high yields are obtained if the soil is properly managed.

This soil has good moisture conditions for crops and a wide crop adaptation; is easily tilled; and is very responsive to good management. It is therefore well suited to all locally grown crops except pasture grasses, and practically any crop rotation is suitable. As a large part of this phase is farmed or managed by owners, management is generally good. Cover crops are worked into the cropping system.

**Chesterfield sandy loam** (2 to 7 percent slopes) (Ch).—Because it developed intermediately between the sandy Coastal Plain and the Piedmont province, this soil has variable characteristics. Its surface soil is somewhat similar to that of the Bowie soils, and its subsoil is similar to that of the Appling or Durham soils of the Piedmont

province. Slopes of 2 to 7 percent are most common; the average slope is 3 percent. Surface runoff is slow to medium; internal drainage, medium. Fields are usually small, as the soil occurs on narrow elongated ridgetops, saddles, and sloping positions. Terracing is difficult, and short crooked rows are necessary to conform to the terraces. The heavy character of the subsoil and the sloping topography are conducive to sheet erosion. Where erosion has removed part of the surface soil, the heavy subsoil tends to become baked and hard, thus creating a droughty condition for crops, particularly corn.

**Profile characteristics:**

**Surface soil—**

0 to 6 inches, pale-brown very friable sandy loam containing angular and rounded quartz gravel in many places; weak fine granular structure.

**Subsoil—**

6 to 12 inches, brownish-yellow firm sandy clay loam, fairly uniform in color; moderate or weak medium blocky structure.

12 to 36 inches, yellow firm compact gritty heavy sandy clay or clay; a few scales of mica; moderate medium blocky structure.

**Underlying material—**

36 inches +, light-red sandy loam material containing partly decomposed coarse-grained granite and gneiss rocks.

Both the surface soil and subsoil are strongly acid. The soil has a fair supply of organic matter, low to medium fertility, and except where erosion has removed a large part of the surface soil, a moderate water-holding capacity. Permeability is moderately rapid in the surface soil and moderate in the subsoil.

*Use and management.*—Approximately 68 percent of Chesterfield sandy loam is open for cultivation, but almost half of the total is idle. Many areas are used for pasture, but grazing is poor. The timbered areas grow principally old-field and shortleaf pines, sweetgum, post and red oaks, and hickory. Cotton, corn, and hay are the principal crops and produce fair yields.

A few included areas produce exceptionally well, but these areas are not representative. In many locations kudzu is used for erosion control and as a temporary pasture crop. About 4 years is required to establish kudzu on this soil.

**Chesterfield sandy loam, rolling phase** (8 to 12 percent slopes) (CL).—Relief is more sloping on this phase than on the normal phase, erosion has been more severe, and granitic rock is nearer the surface. The heavy compact sandy clay lower subsoil does not permit free movement of moisture. Surface runoff is medium to rapid, and susceptibility of the soil to erosion is moderate to high. Internal drainage is medium.

**Profile description:**

**Surface soil—**

0 to 4 inches, pale-brown friable sandy loam containing some rounded quartz gravel; weak fine granular structure.

**Subsoil—**

4 to 10 inches, brownish-yellow firm sandy clay; moderate or weak medium blocky structure.

10 to 30 inches, yellow to yellowish-brown firm and slightly compact heavy sandy clay or clay; moderate medium blocky structure.

**Underlying material—**

30 inches +, light-red sandy loam material containing partly decomposed coarse-grained granite and gneiss rocks.

The depth of the surface soil varies from 0 to 10 inches, depending upon the degree of erosion. Areas are extremely spotty in appearance and in productive capacity. Small spots having the surface soil largely or completely removed are common. Areas with deeper surface soil produce good yields under good management, but those with a shallow surface soil have poor moisture conditions and are droughty for crops. These deep and shallow areas are so closely associated that separate map delineation was impossible.

The soil is strongly acid. It has a fair supply of organic matter, low to medium fertility, and moderate water-holding capacity. It is moderately permeable in the surface soil and subsoil.

*Use and management.*—About one-third of Chesterfield sandy loam, rolling phase, is cleared. Possibly 20 percent of the cleared acreage is used for row crops annually, and the rest is idle or used for pasture. Many areas have reseeded naturally to old-field pine. The forested areas grow largely old-field and shortleaf pines, post oak, and sweetgum.

The cultivated soil is used largely for cotton, hay crops, and some sorghum or corn. Yields are normally low.

The soil is difficult to terrace, and the irregularly shaped fields are not adapted to the use of large farm machinery. The more eroded and sloping areas are possibly best suited to kudzu or forest. For the improvement of this soil, the areas should be carefully terraced, large applications of phosphate and lime applied, large quantities of organic matter turned under, and deep plowing practiced.

#### CONGAREE SERIES

The soils of the Congaree series are brown friable moderately well drained to well drained soils occurring in the first bottoms along streams. They are associated with the poorly drained Wehadkee soil of first bottoms. They have formed from materials washed from the Cecil, Appling, Madison, Davidson, and other upland soils of the Piedmont province and deposited by streams. New materials are deposited at each overflow when there is erosion on the uplands. Some scales of mica are noticeable throughout the soil and subsoil.

These soils are deep. They are used principally for field crops, pasture, and forest. Productivity for crops and pasture is medium under the prevailing management practices. Considerable improvement in productivity can be expected if good management practices are used.

**Congaree silt loam** (0 to 2 percent slopes) (CN).—This is the most extensive and most important first bottom soil in the county. It occupies flat to almost level areas with a gradual slope in the direction of the stream flow. Surface runoff is very slow to slow and internal drainage is medium. Although the soil is moderately well to well drained, it is subject to periodic overflow by streams.

##### Profile description:

Surface soil—

0 to 8 inches, brown friable silt loam; weak fine crumb structure.

Subsurface—

8 to 36 inches, light-brown to yellowish-brown friable silt loam or silty clay loam; weak fine crumb structure.

Underlying material—

36 inches +, brownish-yellow friable fine sandy loam to loose loamy fine sand; a high content of small mica flakes.

Texture ranges from very fine sandy loam to silt loam, but it is usually a silt loam.

This soil is strongly acid. It has a high organic-matter content. Fertility is high, and water-holding capacity very high. Permeability in the surface soil and subsurface is moderate.

*Use and management.*—Even though Congaree silt loam is an important agricultural soil, only 60 percent is cleared for cultivation. More is not cleared because overflows often destroy crops; the billbug is destructive to corn in some locations in certain years; the wooded areas make fair rangeland for cattle and hogs; and somewhat isolated areas are kept in forest. Nuts of various kinds are eaten by hogs; and canes, gray moss, and other underbrush are browsed by cattle. The forested areas produce water and red oaks, hickory, beech, holly, elm, sweetgum, and blackgum.

This soil is fertile and easily tilled and has excellent moisture conditions for crops. It produces, without fertilizer, medium to fairly high yields of the crops to which it is adapted, unless pests or overflows interfere. It is used almost entirely for corn and is one of the most important corn soils in the county. After the corn is harvested, the land is used for pasture or range, and cattle and hogs do well until spring. South of Tallassee some areas are used for cotton.

This soil is also well suited for pasture and Dallis and Johnson grasses; white Dutch clover and lespedeza produce excellent yields. Overflows may destroy some of the grasses, but it has been observed that Dallisgrass and white Dutch clover withstand 3 or 4 days overflow without serious injury. Lespedeza is now growing on many of the areas that are not clean cultivated. An application of 400 to 500 pounds of basic slag or an equivalent amount of superphosphate should be applied to pasture grasses, according to Alabama Agricultural Experiment Station data. No fertilizer is being used for the crops that are now being grown, except cotton, but nitrates may pay if applied to corn. Spring oats can be grown on most areas, but winter production is hazardous on account of overflows.

**Congaree fine sandy loam** (0 to 2 percent slopes) (Cm).—This soil is closely associated with Congaree silt loam. It generally lies a few feet higher and has a more sandy surface soil than the associated soil. It is usually adjacent to rivers on the inside of bends in the form of small levees and occupies level or nearly level areas on the overflow bottoms. Surface runoff is very slow to slow, and internal drainage is medium.

**Profile characteristics:**

**Surface soil—**

0 to 7 inches, grayish-brown to light brownish-gray friable fine sandy loam to very fine sandy loam; very weak fine granular structure.

**Subsurface—**

7 to 45 inches, light-brown to brown friable fine sandy clay or fine sandy loam; essentially structureless.

**Underlying material—**

45 inches +, grayish-brown to dark grayish-brown friable to firm clay; some distinct light-gray and reddish-brown mottles of medium size.

Some small areas, more sandy and much lighter colored than the fine sandy loam, have been included. Uses are the same as for Congaree fine sandy loam, and the areas may or may not be subject to frequent overflow.

Both the surface soil and subsurface are strongly acid. The supply of organic matter and level of fertility are high, and water-holding capacity is very high. Permeability is moderately rapid in the surface soil and moderate in the subsurface layer.

*Use and management.*—Congaree fine sandy loam is an important agricultural soil and approximately 73 percent of it is under cultivation. The rest is in forest of hickory, water and red oaks, beech, elm, sweetgum, and blackgum. The cultivated areas are used largely for corn, but some are used for hay crops, oats, cotton, or pasture. As the soil is fertile and has excellent moisture conditions, fair to good yields are obtained with little or no fertilizer except on cotton. Fall-planted oats usually produce better than those planted in spring; but since the fall crop is subject to destruction by winter floods, plantings are generally made in spring.

Pasture of Dallisgrass, white Dutch clover, or lespedeza does well on this soil. Overflows may destroy some of these grasses, but Dallisgrass and white Dutch clover withstand 3 or 4 days overflow without serious injury. Lespedeza is now growing on many of the areas not clean cultivated. According to the Alabama Agricultural Experiment Station, 400 to 500 pounds of basic slag or an equivalent amount of superphosphate should be applied to the pasture grasses for best results.

#### DUCKER SERIES

The soil of the Ducker series is composed of materials that have washed, rolled, or sloughed from areas of Red Bay, Orangeburg, and Faceville soils and accumulated at the base of slopes and in slight depressions. The soil occupies level or nearly level relief and, although well to moderately well drained, it dries out later than the associated upland soils.

The Ducker soil is deep. It is used mainly for field crops. Productivity is medium to relatively high under common management, but it can be increased somewhat by good management practices.

**Ducker loam** (0 to 2 percent slopes) (DA).—This brown basin soil occurs in association with the red soils of the Red Bay, Faceville, and Orangeburg series, on basins and depression areas in the southwestern and south-central parts of the county and north of the town of Central. Although the areas are small (many less than 1 acre in size), they are numerous. Even though this soil occupies basins and depressions, it is sufficiently drained to be used for general farm crops and grasses. Its character varies with the texture and color of the surrounding soils, the amount of outwash material that has accumulated, and the kind of material on which it was deposited. The soil varies in texture from sandy loam to loam, the loam predominating.

##### Profile description:

###### Surface soil—

0 to 10 inches, reddish-brown to weak-red friable loam; a large quantity of organic matter, and dark splotches of organic accumulation.

###### Subsurface—

10 to 30 inches, dark reddish-brown to light reddish-brown friable clay loam; a large accumulation of organic matter.

###### Underlying material—

30 inches +, gray to light-gray clay loam; many distinct medium to coarse mottles or splotches of dark gray, brown, and yellow.



This soil is medium to strongly acid and medium to high in fertility, and it has a high water-holding capacity. Permeability is moderate in the surface soil and moderate to moderately slow in the subsurface layer.

*Use and management.*—Ducker loam is one of the most productive soils in the county and has wide crop adaptation. Practically all of it is in cultivation, chiefly to corn and hay crops, and fair to good yields are obtained with little or no fertilization. Sorghum, lespedeza, soybeans, oats, and pasture grasses also give fair to good yields. Although cotton yields well, it is generally grown on the surrounding soils. This soil is used mostly for feed crops.

Moisture is ample for large yields, and the use of green-manure crops and mineral fertilizers should build this soil to an unusually high productivity. About 60 bushels of corn and comparable yields of other crops should be obtained. This soil is ideal for pasture, being well suited to Dallisgrass, lespedeza, and white Dutch clover. Excellent yields are produced, but according to results obtained by the Alabama Agricultural Experiment Station, 400 to 500 pounds or more of basic slag should be used. If basic slag is not used, equivalent results can be obtained by using superphosphate and lime.

#### DURHAM SERIES

The soil of the Durham series has a light-gray or pale-yellow friable sandy surface soil and a pale-yellow to yellow friable to firm sandy clay or clay subsoil. It is the lightest colored soil in the Piedmont province part of the county and resembles the Bowie soils of the Coastal Plain. It is developed from the weathered products of light-colored coarse and medium-grained granite and gneiss and is associated with Cecil and Appling soils. It occurs on nearly level to gently sloping relief and is moderately well drained.

The soil is deep. It is used largely for field crops, and productivity is low to medium. Considerable increase in yields can be expected from good management.

**Durham sandy loam** (0 to 5 percent slopes) (DB).—This soil is similar to Bowie sandy loam of the Coastal Plain in color, relief, and crop adaptability. However, it has a heavier subsoil, contains more potash in the subsoil, and has different parent material. As the relief is smooth, the soil is well suited to intertilled crops and to relatively large machinery. Surface runoff is slow to medium, and the hazard of erosion is slight to moderate. Internal drainage is medium.

Profile characteristics:

Surface soil—

0 to 8 inches, light-gray or pale-yellow friable sandy loam; a small quantity of organic matter; weak fine granular structure.

Subsoil—

8 to 20 inches, pale-yellow to yellow friable sandy clay loam; weak medium blocky structure.

20 to 30 inches, yellow firm to friable clay or sandy clay; some distinct medium to coarse red or brown mottles; moderate medium blocky structure.

Parent material—

30 to 36 inches, yellow firm compact clay or sandy clay; some distinct medium to coarse gray mottles.

36 inches +, disintegrated granite and gneiss rock.



The depth to the weathered rock material varies from approximately 1 foot to 3 or 4 feet. Some angular chert and quartz rocks are present, but they do not interfere seriously with cultivation.

Both the surface soil and subsoil are strongly to very strongly acid. The soil has a low to fair supply of organic matter, is low to medium in fertility, and has moderate water-holding capacity. Permeability in the surface soil is moderately rapid and in the subsoil moderate to moderately slow.

*Use and management.*—Practically all of Durham sandy loam is in cultivation, and most areas are used for cotton, corn, and hay crops. This soil is also well suited to the production of peanuts, potatoes, sugarcane, and sorghum. The quality of sirup from cane is very good.

This soil is one of the most dependable in dry years. During wet springs it is a little slow to warm. It is very responsive to good management, has a wide crop adaptation, and is easily tilled. Erosion is easily controlled.

#### EGAM SERIES

The soils of this series occur on high first bottoms. They have brown to dark-brown friable surface soils and dark-brown very firm compact subsurface layers. They have developed from materials washed from soils underlain by limestone and mixed with materials from sandstone and shale. The relief varies from level to gently sloping. The soils are moderately well drained.

The Egam soils are deep. They are principally in field crops and pasture. Productivity is generally low for field crops, but considerable improvement can be expected from better management practices. Productivity for pasture is medium, but some increase can be obtained by good management.

**Egam silt loam** (0 to 3 percent slopes) (EA).—This soil has outwashed from the Limestone Valley. In northern Alabama it is generally associated with Huntington silt loam, but in this county it is associated with Congaree silt loam and occurs on slightly higher positions. It occupies level to very gently sloping relief on the first bottoms. Surface runoff is very slow to slow, and internal drainage is slow. The soil, however, has sufficient drainage except during periods of overflow. Since the soil occurs on the higher bottoms and overflows usually come in winter and spring months when the land is idle, crops are generally not lost.

Profile characteristics:

Surface soil—

0 to 8 inches, brown to dark-brown friable silt loam; weak fine crumb structure.

Subsurface—

8 to 50 inches, dark-brown very firm compact clay; a few fine mica flakes; weak coarse crumb structure.

Underlying material—

50 inches +, dark yellowish-brown friable loamy fine sand containing finely divided mica flakes.

The soil is medium to slightly acid. It is medium to high in content of organic matter and in fertility. It is moderately permeable in the surface soil and slowly permeable in the subsurface layer. Water-holding capacity is moderate to moderately low.

*Use and management.*—About 90 percent of Egam silt loam is cleared land used largely for corn, Johnsongrass, soybeans, lespedeza, sorghum, and pasture. Yields on this soil are fair to good, but not so good as on the closely associated Congaree soils.

The soil is well adapted to pasture of lespedeza, Dallisgrass, and white Dutch clover. Dallisgrass and white Dutch clover survive 2 or 3 days' overflow without serious damage and are therefore especially suitable; other pasture grasses are damaged by periods of overflow.

A livestock program that includes the production of corn, Johnsongrass, sorghum, lespedeza, and pasture would be good for this soil if basic slag or superphosphate was applied liberally.

**Egam silty clay loam** (0 to 6 percent slopes) (EB).—This soil occupies slightly higher positions than the silt loam and has a shallower surface soil. It occurs on low knolls, small ridges, and slight slopes, and when the river overflows, the soil is scoured off and moved to the lower positions. It is associated with Congaree silt loam on the overflow bottom, but it does not occupy level relief. Some areas are nearly level, having slopes not more than 2 percent in gradient; others range from 2 to 6 percent. On the escarpments or short breaks the slopes are steeper. Surface runoff is very slow to medium; internal drainage, slow.

Profile characteristics:

Surface soil—

0 to 4 inches, brown to dark-brown friable silty clay loam; weak coarse crumb structure.

Subsurface—

4 to 50 inches, dark-brown very firm compact smooth clay, hard when dry; a few fine mica scales; moderate coarse crumb structure.

Underlying material—

50 inches +, dark yellowish-brown friable loamy fine sand containing fine mica scales.

Acidity is medium to slight, organic-matter content and water-holding capacity low, and fertility medium. Permeability in the surface soil is moderately slow and in the subsurface slow.

*Use and management.*—Egam silty clay loam is used largely for Johnsongrass, lespedeza, oats, and corn. A livestock program involving the production of oats, Johnsongrass, and pasture is one of the best uses. Lespedeza, Dallisgrass, and white Dutch clover are excellent grasses and legumes for pasture. White Dutch clover and Dallisgrass withstand 3- or 4-day periods of overflow, but the other grasses are damaged. Liberal applications of basic slag or superphosphate are necessary for best pasture development.

A deficiency of moisture for crops during the hot summer season is one of the greatest handicaps to this soil. The droughtiness is the result of shallow surface soil, which allows the subsoil to bake and become hard. When too dry the soil is too hard to be tilled; when too wet it is extremely sticky and plastic. For most satisfactory farming, the soil must be plowed when the moisture condition is best. Farm machinery can be used satisfactorily.

#### FACEVILLE SERIES

The soils of the Faceville series (included in the Ruston series in older soil surveys) have light-gray to brown sandy surface soils and

red friable sandy clay subsoils. They have developed from thick beds of unconsolidated acid sandy loams and sandy clays of the Coastal Plain. In places small rounded quartz gravel is characteristic of the profile. The relief ranges from nearly level or undulating to strongly sloping or hilly, and all areas are well drained.

These soils are deep. They are used largely for field crops and forest. Some parts are used for pasture and truck and garden crops, and some are lying idle. Productivity for field crops is usually medium to low, but it is relatively high for cotton on some of the soils. Considerable improvement in productivity can be made by good management.

**Faceville gravelly sandy loam, thick-surface phase** (0 to 5 percent slopes) (Fc).—There is a larger quantity of small rounded quartz gravel in the surface soil and subsoil than in that of Faceville sandy loam, thick-surface phase. The soil occurs in the northwestern part of the county in close association with other Faceville and some Bowie soils. The relief, seldom exceeding 5 percent, averages about 3 percent. Surface runoff is slow to medium; internal drainage, medium. The more sloping areas can be protected against erosion by terraces.

Profile characteristics:

Surface soil—

0 to 8 inches, light-gray to very pale-brown very friable sandy loam of weak fine granular structure; 20 to 40 percent of the surface mass is composed of rounded quartz gravel varying in diameter from  $\frac{1}{2}$  to 2 inches.

8 to 14 inches, yellowish-brown to light yellowish-brown friable sandy loam containing some gravel; essentially no structure.

Subsoil—

14 to 36 inches, red friable sandy clay; weak to moderate fine to medium blocky structure; may contain a little gravel.

Parent material—

36 inches +, reddish-yellow to brownish-yellow friable sandy clay; some fine splotches of gray and brown; underlain at 40 to 60 inches by stratified sand, gravel, and clay.

All layers of the profile are strongly acid. The soil has a fair to medium supply of organic matter, medium fertility, and moderate to high water-holding capacity. Permeability in the surface soil is moderately rapid and in the subsoil moderate.

Included are areas of Orangeburg gravelly fine sandy loam that were too small to separate on the map, and some small gravel-free areas. These included areas have the same agricultural uses as the Faceville soil.

*Use and management.*—Faceville gravelly sandy loam, thick-surface phase, is a desirable agricultural soil. About 77 percent of it is cleared and for the most part cultivated annually. It is well suited to the crops commonly grown in the region, is easily tilled, and is responsive to good management. General farm crops, including cotton, corn, oats, hay, and sorghum, are produced. Land not cleared is in forest of old-field and shortleaf pines, post oak, sweetgum, and other less important species.

**Faceville sandy loam, thick-surface phase** (0 to 5 percent slopes) (FE).—This soil is closely associated with and related to the Orangeburg and Red Bay soils, but the lower surface soil layer is lighter red than that of the Orangeburg. Most areas can be used for cultivated

crops because of the nearly level to undulating relief, which seldom exceeds 5 percent. Surface runoff is slow to medium; the more sloping areas require some protection from erosion. Internal drainage is medium.

**Profile characteristics:**

**Surface soil—**

0 to 8 inches, yellowish-brown very friable sandy loam; weak fine granular structure.

8 to 14 inches, yellowish-red to light yellowish-brown friable sandy loam; essentially no structure.

**Subsoil—**

14 to 36 inches, red friable sandy clay; weak to moderate fine to medium blocky structure.

**Parent material—**

36 inches +, yellowish-red friable sandy clay containing many medium distinct red mottles; usually grades into sandy and gravelly material somewhere between 40 and 60 inches below the surface.

This soil is strongly acid. It has a fair to medium organic-matter content, medium fertility, and moderate to high water-holding capacity. Permeability in the surface soil is moderately rapid and in the subsoil moderate.

Included are few small areas of Orangeburg and Bowie soils that have the same land use as the Faceville soil. A few gravelly areas are also included. The gravel does not seriously interfere with cultivation and may be beneficial for the production of cotton, as it causes the soil to warm earlier in spring.

*Use and management.*—Faceville sandy loam, thick-surface phase, is one of the important agricultural soils in the county. About 88 percent is in cultivation. The soil is well suited to all locally grown crops, is easily tilled, and is responsive to good management. Tractors can be used satisfactorily on its nearly level to gently sloping fields. Cotton, corn, oats, and soybean hay are the principal crops.

**Faceville sandy loam, sloping thick-surface phase** (6 to 12 percent slopes) (FD).—This phase has more sloping relief than the normal phase, and under similar treatment it has undergone more severe erosion. The surface soil is thinner and browner in many places, and in a few places shallow gullies have formed. This strongly acid soil is scattered over the northwestern, western, and south-central parts of the county. Surface runoff is medium to rapid, and the soil is moderately to highly susceptible to erosion. The 6- to 12-percent slopes are uniform, and terracing is feasible. Carefully constructed terraces are sufficient in most locations, but permanent cover crops like kudzu or sericea lespedeza are more satisfactory on some of the steeper slopes.

Many small eroded areas have a shallow sandy surface soil and are less productive than the rest of the soil. Some areas have a large amount of gravel. The gravel, however, does not interfere seriously with cultivation but hastens cotton growth in spring by causing the soil to warm earlier.

*Use and management.*—Where Faceville sandy loam, sloping thick-surface phase, has been managed carefully, it is fairly productive. It responds to good management, is fairly easily tilled, retains moisture for growing crops, and has a wide crop adaptation. About 58 percent is cleared, and the rest is in forest of old-field and shortleaf pines, post, blackjack, and red oaks, sweetgum, and hickory. The cleared areas are used largely for tilled crops of cotton, corn, cowpeas, soy-

beans, lespedeza, sorghum, and some truck and garden crops. Liberal applications of fertilizer are needed for best crop production. Areas too steep for tilled crops can be planted to kudzu or sericea lespedeza, which may be used for temporary grazing or may be harvested for hay. They should receive liberal applications of basic slag or of superphosphate and lime.

**Faceville-Bowie gravelly sandy loams, hilly phases** (13 to 30 percent slopes) (FA).—This complex consists of mixtures of small areas of Bowie gravelly sandy loam, hilly phase, and Faceville gravelly sandy loam, hilly phase, that cannot be separated on a map of the scale used.<sup>5</sup> It occupies steep slopes in the northwestern and southeastern parts of the county and is too hilly, broken, and subject to erosion for general crop use.

*Use and management.*—This complex is generally suited only to forest, but a very small percentage is cleared land in pasture, cotton, or corn. Fair yields are obtained on the spots cleared until erosion makes their cultivation impractical. These areas are then used for pasture, but the lespedeza, if grazed, makes a scant growth. Kudzu is the best crop for the open areas, as it retards erosion and supplies temporary pasture.

Most of this soil complex is and should be in forest. Adequate measures to prevent fire are practically the only requisite for the reestablishment of a good loblolly, shortleaf, and longleaf pine forest cover in areas where enough trees remain to afford mast for reseedling. This land is suitable for game preserves. Underbrush and cane growth along streams might support deer; nuts, beggarweeds, mast, native vetch, and seeds of native lespedeza, French mulberry, and dogwood are enough to feed quail and turkey.

**Faceville-Bowie gravelly sandy loams, sloping phases** (6 to 12 percent slopes) (FB).—Small areas of intricately mixed sloping phases of Faceville and Bowie gravelly sandy loams make up this complex. The Bowie soil has a grayish-brown to pale-yellow surface soil and a yellow or yellowish-brown friable subsoil with some red mottles in the lower part, whereas the Faceville soil has yellowish-brown to yellowish-red surface soil and a red friable subsoil.

A large quantity of small rounded quartz gravel is on the surface and mixed with the surface soil. It occurs to a less extent in the subsoil. The soils of this complex are strongly acid. They occupy large areas in the northwestern, western, and eastern parts of the county. The slopes (commonly 7 to 8 percent) are complex, necessitating crooked terraces for erosion control. Erosion is severe on tilled areas that are not carefully terraced.

*Use and management.*—Approximately 73 percent of the sloping phases of Faceville-Bowie gravelly sandy loams is in forest of old-field and shortleaf pines, post oak, and sweetgum. The rest is in row crops, kudzu, pasture, or idle land. The more mildly sloping areas are used for cultivated crops, chiefly cotton and corn. Fair to good yields are produced. Kudzu is an excellent temporary grazing or hay crop and is also excellent for erosion control.

<sup>5</sup> For descriptions of the separate soils see Faceville sandy loam and Bowie sandy loam soils (pp. 46 and 27). They are, respectively, the same except for content of gravel.



## GILEAD SERIES

The surface soils of the Gilead series are light gray to pale yellow or grayish brown, and the subsoils are yellow to pale-yellow or yellowish-brown compact or feebly cemented sandy clay. The Gilead soils are more leached in the surface layer than the Bowie soils; their sandy surface soils rest directly on the compacted layer, and they are heavier in the parent material layer. They have developed from sandy loams and sandy clay loams of the Coastal Plain and usually occur near the boundary of the Piedmont province. These well to somewhat excessively drained soils have nearly level to rolling or sloping relief.

The Gilead soils are deep to very deep. They are used principally for field crops and forest; some areas are lying idle. Crop productivity is generally low but can be much improved by good soil management.

**Gilead sandy loam** (0 to 5 percent slopes) (GA).—Relief, land use, and management requirements are similar to those of the associated Bowie sandy loam, but Gilead sandy loam differs in having somewhat lower productivity and a heavier and more compacted subsoil. It occurs mainly in a belt through the central part of the county, generally located between the associated Bowie sandy loam and Gilead sandy loam, eroded phase. It has nearly level to gently undulating or gently sloping relief. Surface runoff is slow to rapid, and internal drainage is slow. Practically all areas need terracing. As they are on simple slopes, most fields, even though terraced, can be farmed satisfactorily with power machinery.

Profile description:

Surface soil—

0 to 6 inches, light-gray to pale-yellow loose sandy loam; structureless.

6 to 15 inches, very pale-brown friable sandy loam or loose loamy sand; essentially no structure.

Subsoil—

15 to 32 inches, yellow to pale-yellow compact or feebly cemented sandy clay; moderate to strong coarse blocky structure.

Parent material—

32 inches +, yellow to reddish-yellow firm compact sandy clay; some medium distinct gray and brown mottles; sand and gravel occur in many locations at depths of 4 to 10 feet.

Some areas have only an 8- to 10-inch sandy surface layer over heavy sandy clay subsoil. These areas are more subject to erosion and have lower crop production than areas where the surface soil is deeper. Small rounded quartz gravel that does not seriously interfere with cultivation is present in many places.

Both the surface soil and subsoil are strongly acid and need lime for best crop production. The soil is low in organic matter and fertility. It has moderate to high water-holding capacity. Permeability in the surface soil is moderately rapid and in the subsoil slow.

*Use and management.*—Approximately 80 percent of Gilead sandy loam is cleared and used largely for cotton, corn, hay, peanuts, and oats. Fairly high yields are obtained under good management, and most of the soil is well managed. The soil is generally owned in small tracts and operated by the owners.

This sandy loam has good moisture conditions for crops, has wide crop adaptation, is easily tilled, has favorable relief, and is responsive



to good management. It is therefore well suited to most locally grown crops, except pasture grasses, and to any of the crop rotation systems suited to the farm program.

**Gilead sandy loam, eroded phase** (2 to 7 percent slopes) (GB).—The long, narrow, irregularly shaped areas of this soil occupy positions intermediate between the sandy soils of the southern part of the county and the red hills of the north-central and northeastern parts. It usually occurs on ridgetops, but a few acres are near the base of slopes. It has gently sloping to sloping relief. Terrace construction is difficult, as extremely crooked terraces are required. These are hard to maintain, since runoff is rapid as a result of the sloping topography and the slowly pervious subsoil. This soil is the result of sheet erosion of the normal phase. Because erosion has not been uniform over the area, the surface soil varies in depth from place to place, and locally all or most of the original sandy covering has been removed.

Profile characteristics:

Surface soil—

0 to 5 inches, light-gray to pale-yellow very friable loamy sand to friable sandy loam; essentially no structure; rounded quartz gravel in some areas.

5 to 7 inches, yellow friable sandy loam; essentially no structure.

Subsoil—

7 to 19 inches, yellow to yellowish-brown compact but brittle sandy clay, hard when dry; moderate to strong coarse blocky structure.

Parent material—

19 to 40 inches, slightly compact heavy sandy clay or clay; distinctly mottled light gray, yellow, and brown.

40 inches +, stratified sand, gravel, and heavy clay; the depth to this layer varies from 37 to 60 inches.

Areas are extremely spotty in appearance and in productive capacity. Small spots having the surface soil completely removed by erosion and the compact sandy clay exposed are common. They have low yields. Other small spots that have a surface depth of 8 to 12 inches are also common and give good yields under good management. The foregoing profile is intermediate between these extremes.

This eroded phase is strongly acid and low in organic matter and fertility. It has moderately low to low water-holding capacity. The surface soil is moderately permeable, and the subsoil slowly permeable.

*Use and management.*—Approximately 78 percent of Gilead sandy loam, eroded phase, is cleared, but not more than 60 percent is cultivated annually. The small irregularly shaped fields make the use of power machinery impractical. Abandoned eroded areas are growing up in sedgegrass, briars, sweetgum, and old-field pine. Forest areas grow principally old-field pine and shortleaf pine, post and red oaks, and sweetgum.

The crops most commonly grown—cotton, corn, oats, and hay—give fair yields under good management. Cotton and oats are well suited, as they are able to extract moisture from the soil.

This soil requires careful management practices that will conserve and maintain its productive capacity. Increasing attention is being given to erosion-control and growing of soil-building crops with clean-cultivated crops. It is important that erosion be held in check and that organic matter be added to the soil by growing legume crops.

Kudzu or sericea lespedeza is being used on some of the more rolling areas for erosion control and as a hay and temporary pasture crop.

**Gilead sandy loam, eroded sloping phase** (6 to 12 percent slopes) (Gc).—This phase differs from the sloping phase in that it is more eroded, is more droughty for crops, and has more limited agricultural possibilities. It occupies an intermediate position between the sandy soils of the southern and western parts of the county and the red hills of the northeastern part. The largest and most extensive areas are northeast of Wetumpka along New Georgia Road and in the vicinity of Claud; many others are scattered over the east-central part of the county. This soil occurs on rolling ridgetops and on areas sloping toward streams. The slopes are irregular and choppy. This relief and the compact character of the subsoil cause rapid surface runoff and severe erosion. Terrace construction and maintenance are difficult. The soil is droughty where the sandy clay is near the surface. Like Gilead sandy loam, eroded phase, this soil is strongly acid and low in organic matter and fertility.

**Profile description:**

**Surface soil—**

0 to 5 inches, grayish-brown to yellowish-brown very friable loamy sand to friable sandy loam; essentially structureless; some small rounded gravel in places.

**Subsoil—**

5 to 22 inches, yellow to yellowish-brown compact but brittle sandy clay; hard when dry; moderate to strong coarse blocky structure.

**Parent material—**

22 to 40 inches, firm sandy clay or clay distinctly mottled light gray, yellow, and brown; underlain by stratified sand and gravel at 40 to 50 inches.

Areas of this soil are extremely different in appearance and productive capacity, but they are too intricately associated to be separated on the map. Some small spots with the surface soil completely removed by erosion have a very low crop production; others with a surface depth of 8 to 12 inches produce good yields under good management.

*Use and management.*—Approximately 40 percent of the eroded sloping phase of Gilead sandy loam is cleared, but not more than 25 percent is cultivated; the rest is lying idle or used for pasture. Many areas have been abandoned and are growing old-field and shortleaf pines, post oak, and sweetgum. The cultivated areas are used largely for cotton, hay, and corn, and low yields are generally obtained. Corn is grown only on the small areas where erosion has been less severe. Fields are irregularly shaped, rows are extremely crooked, and large machinery is not adapted. Kudzu is slow to become established on this soil, but when once established it retards erosion and supplies some grazing or hay. Timber production is one of the best uses for the soil.

**Gilead sandy loam, sloping phase** (6 to 12 percent slopes) (Gd).—This phase occurs on more sloping relief and is less uniform in thickness of the surface soil than the normal phase. Surface runoff is medium to rapid, internal drainage slow, and the erosion hazard high. The soil areas are small and scattered.

**Profile characteristics:****Surface soil—**

0 to 6 inches, grayish-brown loose sandy loam; essentially no structure.

6 to 12 inches, yellowish-brown friable sandy loam or loamy sand; essentially structureless.

**Subsoil—**

12 to 20 inches, yellow to yellowish-brown compact but brittle sandy clay; hard when dry; moderate to strong coarse blocky structure.

**Parent material—**

20 inches +, brownish-yellow firm sandy clay; yellowish-red and very pale-brown distinct medium mottles common; a sand and gravel layer underlies this soil at 4 to 10 feet.

The surface depth is variable. In some places the surface soil is completely removed and the underlying heavy sandy clay subsoil is exposed; in others, the soil is a loamy sand to depths of 25 to 30 inches. The more sandy areas are usually the most productive.

This soil is strongly acid, low in organic matter and fertility, and moderately low to low in water-holding capacity. Permeability is moderately rapid in the surface soil and slow in the subsoil.

*Use and management.*—About 54 percent of Gilead sandy loam, sloping phase, is cleared and planted chiefly to cotton, corn, hay, and peanuts. Yields are low but they can be increased by the use of adequate mineral fertilizer and by turning under organic matter in the form of winter or summer legumes.

Although terracing is difficult in this soil, terraces as well as crop rotation are needed for soil conservation. Fertility is inherently low, but response to good management is fair and tillage is relatively easy. Large machinery, however, is unsuited, as the fields are small and irregularly shaped. The sloping and eroded areas should be planted to kudzu or some other perennial crop.

The forested areas consist mostly of old-field and shortleaf pines, post oak, and sweetgum.

**HELENA SERIES**

The Helena soils in the upper surface soil are very dark grayish brown to gray and in the lower part light yellowish brown to pale yellow. The subsoil is light yellowish-brown to gray firm heavy clay that is slightly plastic when wet. It contains many light-gray, brown, and red mottles. These soils are derived from weathered products of binary or aplitic granite and are locally influenced by materials from basic rocks of the Piedmont province. Internal drainage is slow owing to the heavy clay subsoil, and the soils are somewhat poorly drained. Surface relief ranges from nearly level to hilly or strongly sloping.

These soils are moderately deep to deep (between 20 and 60 inches). They are used mainly for field crops, pasture, and forest, and some range land. Productivity for the field crops is medium to low and for pasture medium. Considerably improved productivity is obtained by the use of good soil management practices.

**Helena loamy sand** (0 to 5 percent slopes) (Hb).—This soil has a deeper sandy surface than Helena sandy loam. Surface runoff is slow to medium; internal drainage is slow. Erosion hazard is slight to moderate. The uniform and simple slopes permit fairly easy terrace construction and maintenance and the use of farm machinery.

Profile characteristics:

Surface soil—

0 to 7 inches, light-gray or light brownish-gray loose loamy sand; weak fine granular structure.

7 to 18 inches, light yellowish-brown friable sandy loam; essentially structureless.

Subsoil—

18 to 40 inches, light yellowish-brown firm heavy clay, plastic when wet; many prominent medium mottles of brown and yellow and some of red; strong medium blocky to massive structure.

Parent material—

40 inches +, mixed light-gray, dark grayish-brown, and yellowish-red disintegrated aplitic granite.

In a few places small angular quartz fragments that do not seriously interfere with cultivation are on the surface.

The soil is strongly acid and low in organic matter and fertility and has a moderate water-holding capacity. Permeability in the surface soil is moderately rapid and in the subsoil slow.

*Use and management.*—The 69 percent of Helena loamy sand that is cleared is used largely for cotton, corn, oats, and hay crops. The rest is in forest of sweetgum, post oak, and old-field pine. Most of the cropped areas are well managed. Although sericea lespedeza is not grown at present, it should do well on this soil.

**Helena sandy loam** (2 to 6 percent slopes) (HA).—This soil occurs in the Piedmont province on undulating to sloping positions. Surface runoff is medium to rapid, but a few small areas are almost level and not sufficiently drained for best crop production. Erosion is active and destructive on the more sloping areas under clean cultivation. Each inch of surface soil lost is serious, as the closer the heavy subsoil is to the surface, the less productive the soil. Most of the slopes are fairly uniform, and terraces can be constructed and maintained effectively. The terraces, however, must be high enough to impound the water and allow it to be absorbed gradually, as downward movement of water is retarded by the heavy subsoil.

Profile characteristics:

Surface soil—

0 to 7 inches, very dark grayish-brown to gray friable sandy loam; in places contains  $\frac{1}{2}$ - to 3-inch quartz fragments; weak fine granular structure.

7 to 10 inches, light yellowish-brown to pale-yellow friable sandy loam; essentially no structure.

Subsoil—

10 to 36 inches, light yellowish-brown firm heavy clay, slightly plastic when wet; many prominent light-gray and red medium mottles; strong medium blocky or massive structure.

Parent material—

36 inches +, mixed light-gray, dark grayish-brown, and yellowish-red disintegrated aplitic granite.

Many areas have angular quartz fragments on the surface, but these do not seriously interfere with cultivation.

Both the surface soil and subsoil are strongly acid. The soil is low in organic matter and fertility. Permeability is moderately rapid in the surface soil and slow in the subsoil.

*Use and management.*—Approximately 70 percent of Helena sandy loam has been cleared of timber. About half is used for cropland, and the rest is in pasture. Under prevailing practices fair yields of the principal crops are obtained. Sorghum is also grown. Sweetgum,

old-field pine, and post oak constitute most of the timber on forested areas. The soil retains a fair quantity of moisture and is fairly well suited to pasture; it supports lespedeza, Dallisgrass, and some carpetgrass. These grasses give excellent results if either superphosphate and lime or basic slag is applied.

**Helena sandy loam, rolling phase** (7 to 18 percent slopes) (Hc).—This soil is more sloping to hilly, more eroded, and less used for crops than the normal phase. It has a gray sandy loam surface soil about 8 inches thick over a gray, firm, heavy clay (plastic when wet) subsoil with many prominent brown, red, and yellow medium-sized mottles. In some locations 1- to 6-inch quartz fragments on the surface interfere with cultivation. Rainfall is not absorbed readily, and the rapid runoff causes severe erosion in the tilled areas and an appreciable quantity in the forested areas.

*Use and management.*—About 28 percent of Helena sandy loam, rolling phase was cleared of timber and planted to row crops. However, because of the heavy, sticky character of the soil and its susceptibility to erosion, a large part of the cleared area has been allowed to develop into native pasture of lespedeza, carpetgrass, and Dallisgrass, for which it is well suited. Only a small percentage is being used for tilled crops, mostly cotton.

Judging by results obtained by the Alabama Agricultural Experiment Station on a similar soil, this soil is well suited to sericea lespedeza.

The soil is especially well suited to the production of old-field pine. Adequate measures to prevent fire are necessary for reestablishment of a good loblolly and shortleaf pine forest cover. Longleaf and slash pines generally require planting. Game preserves could be established, as enough nuts, beggarweed, mast, native vetch, native lespedeza, French mulberry, dogwood, and other food is produced for quail and turkeys.

#### HOULKA SERIES

The Houlka soils, on alluvial fans and overflow first bottoms, are derived from materials washed from both the calcareous prairies and from acid sandy soils of the Coastal Plain. They are generally composed of interstratified sands and clays. Dark-gray heavy clay constitutes most of the profile. The soils occupy level to slightly depressed positions and are somewhat poorly drained.

These soils are deep. They are used chiefly for pasture and hay. Productivity is low to medium. Much improvement in productivity is possible under better management, especially adequate fertilization.

**Houlka soils** (0 to 2 percent slopes) (Hd).—These first bottom soils are derived from materials washed from a mixture of Black Belt or limeland soils (Vaiden clay) and acid sandy soils of the Coastal Plain. Surface runoff is very slow and internal drainage is slow. Practically all of the Houlka soils are confined to an area south of Wetumpka.

*Profile characteristics:*

Surface soil—

0 to 18 inches, dark-gray to dark-brown firm clay; sticky when wet; weak medium blocky structure.



## Surface—

18 to 30 inches, gray sandy material, usually loamy sand to sandy loam; essentially structureless; in places material extends to a depth of 40 inches before a change is evident.

## Underlying material—

30 inches +, light-gray friable silty clay loam to clay; some distinct medium mottles of yellow and brown.

The profiles vary from place to place according to the quantity of sand that has been intermixed with the clay. In many places clay and sand layers alternate. Some spots are neutral, others are strongly acid.

These soils are medium acid throughout. They have a medium organic-matter content and medium to high fertility. Water-holding capacity is moderate. The surface and subsurface soils are slowly permeable.

*Use and management.*—Houlka soils are used almost entirely for pasture and hay and some corn. They are especially well suited to Dallisgrass, Johnsongrass, black medic, soybeans, white Dutch clover, oats, and sorghum. An application of 400 to 600 pounds an acre of basic slag or an equivalent amount of superphosphate promotes large yields of pasture grasses and legumes.

## HUCKABEE SERIES

The soils of the Huckabee series (formerly included in the Kalmia series) have light-gray, pale-yellow, or gray surface soils and yellow to pale-yellow, or very pale-brown subsurface layers. They closely resemble the members of the Lakeland series of the uplands. They occur along streams of the Coastal Plain region on terrace positions lying largely above overflow. These soils are sandy and have developed from materials washed from light-colored acid soils of the Coastal Plain, but in some places there is a slight admixture of materials from soils of the Piedmont province. They occupy level to gently sloping positions. They are somewhat excessively to excessively drained because their porous sandy profiles allow rapid internal water movement.

These soils are deep to very deep. They are used principally for field crops and forest. Productivity for crops is low to very low but it can be considerably improved by good management.

**Huckabee loamy sand** (0 to 4 percent slopes) (He).—This soil differs from Kalmia sandy loam in that it is more sandy, more subject to leaching, and lighter in color. The excellent relief favors the use of large machinery, and the soil seldom requires terracing. Surface runoff is slow to medium, and the soil is only slightly to moderately susceptible to erosion.

## Profile characteristics:

## Surface soil—

0 to 7 inches, light-gray to pale-yellow loose loamy sand containing a small quantity of organic matter; weak fine granular structure.

## Subsurface—

7 to 36 inches, yellow to pale-yellow loose loamy sand; structureless.

## Underlying material—

36 inches +, yellow friable sandy loam grading into stratified sand, gravel, and clay at 4 to 6 feet.

Included with this soil are small areas of Kalmia sandy loam, Independence loamy sand, a poorly drained phase of Huckabee loamy sand, and a few gravelly areas.

The profile is strongly acid and low in fertility. Permeability is moderately rapid throughout the soil; water-holding capacity is moderately low.

*Use and management.*—General farm crops such as cotton, corn, hay, and oats are being grown on most of the 73 percent of Huckabee loamy sand that is cleared. Although this soil is well suited to these crops, it is better suited to peanuts, truck crops, grapes, and watermelons.

This is a fair soil for most locally grown crops, as it drains rapidly, warms early in spring, is easily tilled, and retains a fair quantity of moisture. It is, however, subject to leaching of its soluble plant nutrients, and large quantities or frequent applications of fertilizer are therefore required annually. Turning under organic matter in the form of vetch or Austrian peas is especially recommended.

Experiments conducted on similar soils by the Alabama Agricultural Experiment Station indicate that large yields of most locally grown crops may be obtained on this soil by regular use of cover crops in the rotation.

**Huckabee sand** (0 to 4 percent slopes) (Hr).—This, the most sandy soil of the terraces, is somewhat comparable to Lakeland sand of the Coastal Plain uplands. The relief is nearly level to very gently sloping or gently undulating. Surface runoff is slow to medium, internal drainage rapid, and the erosion hazard slight to moderate. The soil occurs on high terraces bordering the Coosa and Tallapoosa Rivers; the largest areas are near Millbrook and in the south-central and southeastern parts of the county. It is susceptible to leaching of its soluble plant nutrients. If satisfactory yields are to be obtained, fertilizer and organic matter must be added annually to replace those removed by the heavy rains.

Profile characteristics:

Surface soil—

0 to 6 inches, gray loose sand containing a small quantity of organic matter; essentially no structure.

Subsurface—

6 to 50 inches, very pale-brown loose incoherent sand or fine sand; essentially structureless.

Underlying material—

50 inches +, yellow sand usually extending to a depth of 6 to 8 feet; may grade at varying depths into pale-yellow sandy clay in which some gray mottles are distinct.

Small areas of Independence sand, which are brown in color and generally more productive than Huckabee sand, are included. A few small areas of Huckabee loamy sand, much more productive than this soil, are also included.

This soil is strongly to very strongly acid, low in organic matter, and very low in fertility. It is rapidly permeable throughout and has low to very low water-holding capacity.

*Use and management.*—Approximately 73 percent of Huckabee sand is cleared; the rest is in forest, principally old-field pine and post oak. The cleared areas are used for corn, cotton, oats, peanuts, potatoes, sorghum, and watermelons. Soils of this character in other parts of the State are used almost entirely for peanuts, which are rotated with cotton or truck crops, principally peas and watermelons.

Experiments conducted by the Alabama Agricultural Experiment Station indicate that fair to good yields of crops may be obtained when good management practices are used.

#### INDEPENDENCE SERIES

The surface layer of the soil of the Independence series (formerly included in the Cahaba series) is grayish brown to yellowish brown, and the subsurface layer light brown to yellowish brown. The soil is sandy. It occurs on stream terraces along the large streams and lies well above ordinary overflows. It is derived from materials washed principally from the upland soils of the Coastal Plain. The open porous profile causes the soil to be somewhat excessively drained.

The soil is deep to very deep. It is used largely for field crops. Productivity is usually low, but considerable improvement can be expected from better management practices.

**Independence loamy sand** (0 to 3 percent slopes) (1A).—This soil differs from Cahaba sandy loam principally in texture and to a certain extent in color and consistence. It is similar to Eustis loamy sand, a reddish soil not mapped in this county, but occupies terrace rather than upland positions. Terracing is rarely needed, as relief is excellent (nearly level to very gently sloping). Surface runoff is slow and internal drainage medium to rapid.

Profile characteristics:

Surface soil—

0 to 7 inches, grayish-brown to brown loose loamy sand; weak fine granular structure.

Subsurface—

7 to 30 inches, light-brown to yellowish-brown loose loamy sand; essentially no structure.

Underlying material—

30 inches +, brown to yellowish-brown friable sandy loam, grading into stratified sand, gravel, and heavy clay at depths of 4 to 6 feet.

A few small areas of Independence fine sand and Huckabee loamy sand having the same general agricultural possibilities as Independence loamy sand are included with it.

Both the surface soil and subsurface layer are medium to strongly acid. The soil is low in organic matter and low to medium in fertility. It has moderately rapid permeability throughout.

*Use and management.*—About 90 percent of Independence loamy sand is cleared; most of it is used for general farm crops—cotton, corn, hay, and oats. It is well suited to these crops, but is best used for peanuts, truck crops, grapes, and peaches.

It is a good soil for most locally grown crops, as it drains rapidly, warms early in spring, is easily tilled, retains a fair quantity of moisture, and is level enough for the use of farm machinery. On the other hand, it is subject to leaching of its soluble plant nutrients and requires large applications of fertilizer annually. Turning under large quantities of organic matter in the form of legumes is especially recommended.

#### IZAGORA SERIES

The soil of the Izagora series (included in the Kalmia series in older soil surveys) is somewhat similar to Kalmia soils in the surface and upper subsoil layers and has characteristics similar to the Flint or Leaf

soils (not mapped in this county) in the lower subsoil. It occurs on stream terraces along the streams in the Coastal Plain and has formed from materials washed from acid upland soils. It occupies level or nearly level positions. The lower part of the subsoil is firm clay or fine sandy clay and is slowly permeable; for this reason the soil is only moderately well drained.

The Izagora soil is deep. It is used largely for field crops and forest. Productivity for crops is low, but by better management practices the productivity level can be raised considerably.

**Izagora loamy fine sand** (0 to 2 percent slopes) (1B).—This soil has a surface soil and upper subsoil similar to those of Kalmia sandy loam, but a lower firm subsoil similar to that of Leaf or Flint soils (not mapped in this county). It occurs on level or nearly level relief. Surface runoff is slow to very slow and internal drainage is medium to slow.

*Profile description:*

*Surface soil—*

0 to 6 inches, dark grayish-brown loose loamy fine sand containing some organic matter; weak fine granular structure.

6 to 18 inches, light olive-brown loose loamy fine sand or friable fine sandy loam; essentially no structure.

*Subsoil—*

18 to 26 inches, light yellowish-brown friable fine sandy clay loam; weak medium blocky structure.

26 to 40 inches, yellowish-brown firm clay or heavy fine sandy clay; many strong-brown and light-gray distinct medium-sized mottles; moderate medium blocky structure; some small scales of mica and soft iron concretions.

*Underlying material—*

40 inches +, light-gray friable loamy fine sand containing some small scales of mica.

Small areas of sand pockets and a few wet spots are included with this soil. In some locations, especially south of Wetumpka, the soil is not so deep as described above; the heavy clay is only 10 to 14 inches beneath the surface and is more sticky and plastic.

The soil is strongly acid, fair to low in organic matter, and medium to low in fertility. Permeability is moderately rapid in the surface soil and slow in the subsoil. The water-holding capacity is moderate.

*Use and management.*—Crops, chiefly cotton, corn, and oats, are on about 75 percent of Izagora loamy fine sand. Acre yields are relatively low.

As the sandy surface soil is deep, it is subject to leaching. Liberal applications of fertilizer are necessary annually in order to maintain productivity. The continuing use of leguminous cover and green-manure crops in rotation with general farm crops will help to maintain productivity. Experiments conducted by the Alabama Agriculture Experiment Station on a soil similar to this one indicate that good yields of corn may be obtained following a legume crop that has been turned under. If liberally fertilized, other crops, particularly cotton, give satisfactory yields when used in a cotton, legume, and corn rotation.

#### JAMISON SERIES

The soil of the Jamison series is derived from recent colluvial materials that have rolled, sloughed, or washed from Bowie, Gilead,

and other gray soils of the Coastal Plain. It is light gray or gray in the surface soil and light brownish-gray in the subsurface layer. It is normally sufficiently well drained for crops, even though it dries out later than the associated upland soils.

The soil is deep. It is used principally for field crops, pasture, and forest. Productivity for crops and pasture is medium. Much higher productivity is obtained under suitable management practices, including proper fertilization.

**Jamison fine sandy loam** (0 to 2 percent slopes) (JA).—This gray soil occupies basins, depressions, and similar areas of level or nearly level relief at the base of upland slopes. Surface runoff is slow, and internal drainage is medium. Some of the more nearly level areas have been artificially drained and are suitable for most locally grown crops. This soil is located principally in numerous small areas in the northwestern and western parts of the county.

Profile characteristics:

Surface soil—

0 to 8 inches, light-gray to gray friable fine sandy loam to loamy fine sand; fair quantity of organic matter; weak fine granular structure.

Subsurface—

8 to 30 inches, light brownish-gray friable fine sandy loam containing splotches of organic matter; essentially no structure.

Underlying material—

30 inches +, gray to light-gray or pale-yellow friable sandy clay loam; some distinct medium mottles of brown.

There are many variations in depth, texture, and color.

The soil is strongly acid. It contains a fair to medium supply of organic matter and is medium in fertility. Permeability is moderately rapid in the surface soil and moderate in the subsurface layer.

*Use and management.*—Approximately 69 percent of Jamison fine sandy loam is cleared; the rest grows principally sweetgum and some old-field pine. The cleared areas are used for corn, soybeans, lespedeza, sorghum, and pasture, and yields are above the average for the county. Very little fertilizer is used, but the use of either basic slag or lime and superphosphate, followed by a legume crop to be turned under, would increase the yields, especially for sorghum, soybeans, and lespedeza. The moisture supply is usually ample for crops. A few areas are planted to cotton, and when the soil is properly fertilized and other appropriate management practices are used, yields are good to excellent.

Many areas make good pasture of white Dutch clover, lespedeza, and Dallisgrass. An application of 300 to 500 pounds an acre of basic slag or an equivalent quantity of lime and superphosphate is recommended by the Alabama Agricultural Experiment Station.

#### KALMIA SERIES

The surface layers of the soils of this series are dark grayish-brown or light brownish-gray to pale yellow, and the subsoils are predominantly yellow. They closely resemble the members of the Bowie series of the uplands. They occur along streams of the Coastal Plain region on terrace positions lying largely above overflow. These soils have developed from material washed from acid soils of the Coastal Plain, but in some places there is a slight admixture of materials from soils of the Piedmont province. They occupy practically level positions and are moderately well drained.



The Kalmia soils are deep to very deep. They are used largely for field crops and forest. Productivity for the crops is medium under common management, but much improvement can be expected if the better management practices are used.

**Kalmia loamy sand** (0 to 3 percent slopes) (KB).—This soil differs from Kalmia sandy loam in having a coarser surface soil and a subsoil that is 18 to 24 inches below the surface. The topography is nearly level to very gently sloping, and erosion is negligible. Terraces may be helpful in a few places, but they are seldom needed. This soil has slow surface runoff and medium internal drainage. As the soil is sandy and porous, percolating rainwater may remove the soluble plant nutrients from the surface soil before plants can use them.

**Profile characteristics:**

**Surface soil—**

- 0 to 6 inches, dark grayish-brown to light brownish-gray loose loamy sand; weak fine granular structure; contains a fair quantity of organic matter.
- 6 to 18 inches, light yellowish-brown or pale-yellow loose loamy sand or very friable sandy loam; essentially structureless.

**Subsoil—**

- 18 to 46 inches, yellow friable sandy loam to sandy clay loam; weak medium blocky structure.

**Underlying material—**

- 46 inches +, yellow friable sandy clay; a small number of faint fine mottles of gray and brown.

Included are some areas of the deep phases of Kalmia very fine sandy loam, Cahaba fine sandy loam, and Cahaba very fine sandy loam. The soils having extremely fine texture are located along the river south of Tallassee.

This soil is strongly acid and medium in fertility. Permeability is moderately rapid in the surface soil and moderate in the subsoil.

**Use and management.**—Approximately 80 percent of Kalmia loamy sand is open for cultivation, and its large fields are well suited to machinery. Even though it is subject to leaching, it is a good soil for general farm crops. It is easily tilled, responds readily to good management practices, retains a large quantity of moisture for growing crops, and can be farmed under a wide range of moisture conditions. It is not subject to erosion and has a wide crop adaptation.

**Kalmia sandy loam** (0 to 2 percent slopes) (KA).—This soil occupies terrace positions and in most respects is comparable to Bowie sandy loam of the uplands. In structure and consistence it is similar to Cahaba sandy loam, with which it is generally associated, but it has a light yellowish-brown or yellow rather than a yellowish-red subsoil. Relief is level or nearly level. Surface runoff is slow, and internal drainage is medium.

**Profile description:**

**Surface soil—**

- 0 to 6 inches, dark grayish-brown to light brownish-gray friable sandy loam or loose loamy sand; weak fine granular structure.
- 6 to 12 inches, light yellowish-brown friable sandy loam; essentially no structure.

**Subsoil—**

- 12 to 50 inches, light yellowish-brown or yellow friable sandy clay loam; weak medium blocky structure.

**Underlying material—**

- 50 inches +, strong-brown slightly compacted sandy loam; has a small number of faint fine red mottles.

Some areas of Kalmia very fine sandy loam and Kalmia loam south of Tallassee, too small to separate on the map, are included with this soil. A few areas contain some small rounded gravel, but not a sufficient quantity to interfere seriously with cultivation or crop yields. A few imperfectly drained areas having mottled gray and brown lower subsoils are in the west-central part of the county. These areas produce excellent crops during dry years but are late for planting when the spring season is unusually rainy.

This is a strongly acid soil. It has a fair quantity of organic matter and medium fertility. Permeability is moderately rapid in the surface soil and moderate in the subsoil. The water-holding capacity is moderate to high.

*Use and management.*—The large level fields of Kalmia sandy loam permit the use of large machinery. Since it is one of the dependable soils in the county and is well suited to all locally grown crops, about 80 percent has been cleared for cultivation. It is responsive to good management, easily tilled, and not subject to serious erosion.

#### LAKELAND SERIES

The soils of the Lakeland series (formerly included in the Norfolk series) are characterized by light-gray or grayish-brown to light yellowish-brown surface soils and brownish-yellow to pale-yellow subsurface layers. They are derived from unconsolidated deposits of sand, loamy sand, and sandy loam of the Coastal Plain and occur in association with Bowie, Faceville, and Gilead soils. They occupy nearly level to sloping or rolling upland. Owing to their sandy porous profile, they are somewhat excessively to excessively drained.

These sandy soils are deep to very deep. Their principal use is for field crops and forest. Productivity for crops ranges from low to very low, but it can be increased in most of the soils by suitable management practices, including proper fertilization.

**Lakeland loamy sand, shallow phase** (0 to 5 percent slopes) (LA).—This soil, intermediate between Bowie sandy loam and Lakeland sand, has more clay in the subsoil than Lakeland sand, but not so much as Bowie sandy loam. In productivity it is most like Bowie sandy loam, as it yields well with proper fertilization and other good management. The most typical and most extensive areas are located in the central and southeastern parts of the county. The slopes range from 0 to 5 percent but average between 2 and 3 percent. The soil has slow to medium surface runoff and medium to rapid internal drainage. Erosion is negligible because of the gentle relief and the capacity of the soil to absorb moisture readily. Where erosion does occur, terraces should be used.

##### Profile description:

##### Surface soil—

0 to 7 inches, grayish-brown to light-gray loose loamy sand; very weak fine granular structure.

7 to 32 inches, light yellowish-brown to pale-yellow loose loamy sand; structureless.

##### Subsurface—

32 to 50 inches, brownish-yellow to yellow friable sandy loam or sandy clay loam; structureless.

##### Underlying material—

50 inches +, yellow firm sandy clay; some distinct medium mottles of brown and gray.

The soil is strongly acid, low in organic matter and fertility, and moderate to moderately low in water-holding capacity. Permeability is moderately rapid.

As this soil is closely associated with Bowie sandy loam and its deep phase and with Faceville sandy loam, a few small areas of each were included in mapping. Some small areas have numerous pieces of water-worn gravel on the surface and in the soil. All of these inclusions are similar to the loamy sand in crop adaptation, yields, and fertilizer requirements. Areas of Faceville loamy sand that have brownish-gray surface soil and yellowish-brown to brown subsoil and extend to depths of 5 or 6 feet are also included.

*Use and management.*—Although Lakeland loamy sand, shallow phase, is subject to leaching of the plant nutrients, even under good management, it is an important agricultural soil in the county. About 72 percent is cleared for cultivation. It responds readily to good fertilizer practices, is easily tilled, and is not seriously affected by erosion. The soil lends itself to diversified general farm crops.

Some areas of this soil are especially productive, as they occur at the foot of slopes where organic matter accumulates and where moisture conditions are favorable.

A large part of the plant nutrients that are not utilized during the current crop year are carried away (leached) by rainfall during the winter season. It is necessary to keep crops growing on this soil in order to hold nutrient losses to a minimum.

**Lakeland loamy sand, sloping shallow phase** (6 to 12 percent slopes) (LB).—This phase occurs on stronger relief than the shallow phase, is more eroded, and has lower crop yields and a smaller percentage in agricultural use. The greater part of this soil occupies sloping to rolling relief; it generally occurs on lower slopes below steep areas. Well-constructed terraces are usually sufficient to control erosion on the more gentle slopes. Gully erosion is more severe than sheet erosion. Both the surface soil and subsurface layers are strongly acid. Some small rolling areas of Lakeland sand and some gravelly areas are included.

*Use and management.*—Only 45 percent of this soil is cleared land. The rest is in timber—post and blackjack oaks and old-field and longleaf pines. The cultivated areas are used largely for cotton, corn, and hay. These crops are seldom grown on large areas, but in small fields of a few acres. Under this system erosion is not severe, even though the areas are sloping to rolling. Kudzu, sericea lespedeza, or some other dense-growing crop should be used on the more sloping areas. The small fields and the sloping surface preclude the use of large machinery. If field sizes are increased, more carefully constructed and longer terraces are needed. The steeper areas should remain in timber.

Fair yields are normally obtained on the areas selected for farming. Peanuts, grapes, peaches, and figs are well suited to this soil.

**Lakeland sand** (0 to 5 percent slopes) (Lc).—This soil is called deep sand and is one of the most sandy upland soils in the county. It is mapped chiefly in the southeastern part. The relief varies from nearly level to gently sloping (slopes average between 2 and 4 percent). Even though areas are gently sloping, they do not suffer seriously from

erosion, as rainwater percolates rapidly. Enough water runs off, however, to cause slight gully erosion on the steeper slopes of clean-cultivated fields.

**Profile characteristics:**

**Surface soil—**

0 to 6 inches, gray or light brownish-gray loose sand; very weak fine granular structure; small organic matter content.

**Subsurface—**

6 to 50 inches, light yellowish-brown to pale-yellow loose sand; structureless.

**Underlying material—**

50 inches +, pale-yellow firm sandy clay loam showing a moderate number of distinct medium gray and brown mottles; depth to this layer variable, ranging from 3 to 9 feet.

A few small areas of Lakeland loamy sand and Eustis sand (a reddish sand not mapped separately in this county) are included with this soil.

The soil is strongly to very strongly acid and its sandy porous profile does not hold sufficient moisture and plant nutrients for large crop yields. It is therefore deficient in fertility and is droughty for crops unless managed properly.

*Use and management.*—Approximately 40 percent of Lakeland sand is cleared; the rest is in forest of old-field pine, post and blackjack oaks, and some longleaf pine. The cleared areas are used largely for such general farm crops as cotton, corn, and hay crops, and a small amount is in truck and garden crops. According to observations made in other locations, this soil is suited to peanuts, peas, peaches, grapes, figs, and early spring truck crops. All crops have low yields unless the soil is heavily fertilized or large quantities of organic matter are turned under. Winter cover crops make excellent growth when fertilized with basic slag or some other phosphatic fertilizer.

Experiments at the Alabama Agricultural Experiment Station indicate that fair to good yields of crops may be obtained on this soil by the regular use of cover crops and by other good management practices.

**Lakeland sand, sloping phase** (6 to 12+ percent slopes) (Ld).—This phase occurs on strongly sloping to hilly topography. The gray sand surface soil contains some organic matter and overlies a light yellowish-brown to pale-yellow loose incoherent sandy subsurface layer. At a depth of 3½ to 4 feet there is a yellow friable sandy clay with a moderate number of distinct gray and brown coarse mottles or splotches. The soil is subject to gully erosion. The relief and the porous sandy character permit a large part of the water to percolate through the soil. The soil is thus leached of most of its plant nutrients and is poorly suited to tilled crops.

*Use and management.*—Despite the low inherent productivity of Lakeland sand, sloping phase, approximately 11 percent is cultivated, but not more than 5 or 6 percent annually. Cotton, corn, peas, and peanuts are the principal crops. Peanuts are fairly well suited, and grapes, figs, and peaches are grown with fair success provided they are heavily fertilized. A common practice is to grow row crops 1 to 3 years and then allow the areas to remain idle 2 to 4 years so that lespedeza and weeds may grow for soil improvement and erosion control.

Forest is the best use for most areas of this soil. Post oak constitutes a large percentage of the cover. Old-field and longleaf pines are present, and their growth should be encouraged. Forest areas could be materially improved by removing the post oaks and planting more valuable species.

#### MIXED ALLUVIAL LAND

The mixed textures and variable drainage conditions of Mixed alluvial land (0 to 2 percent slopes) (MA) make it impossible to classify this land type into definite types at the scale used in mapping. The component soils, formed from sediments washed from soils of the Coastal Plain and Piedmont provinces, were brought down and deposited in the first bottoms by the streams during times of overflow. The surface soils range in color from gray or dark gray to very dark gray or gray mottled with yellow or brown, and in texture from fine sandy loam or loamy fine sand to silt loam. The underlying materials are light gray or gray, mottled with yellow or brown, fine sandy loam, clay loam, or loamy fine sand and have a very friable to firm consistency. Locally, the first few inches of the surface soil is brown and the entire profile contains small mica flakes. The organic-matter content is fair to medium. The soils are strongly acid.

These areas have slow to very slow runoff and very slow internal drainage and are predominantly poorly drained. They are subject to frequent overflow and have their water table near the surface during ordinary seasons. Artificial drainage, including the straightening and deepening of the present stream channels and the digging of lateral ditches, is necessary to reclaim areas for successful crop production. Drainage is difficult to maintain in the more sandy areas, as the sand from ditch banks sloughs into the channels.

This land type is well distributed throughout the county, and occurs in narrow to wide first bottoms along most of the streams. The native vegetation consists of sweetgum, willow, alder, sycamore, bay, walnut, and blackjack oak, with some yellow-poplar and short-leaf pine on the outer edges and better drained areas of the bottoms. There is usually an undergrowth of gallberry bushes, vines, briers, weeds, and swamp grasses.

*Use and management.*—About 10 percent of Mixed alluvial land is cleared, drained, and tilled. Most of the areas under cultivation are at the head of or near the edge of the stream valleys where drainage is best. At one time the stream channels were kept open, and corn was the main crop; but the channels have now become filled or partly filled with sand, and disastrous overflows are frequent. Most of the areas subject to overflow reverted to forest. The drained areas are used for corn, sorghum, sugarcane, fall garden crops, and pasture. Little commercial fertilizer is used, but superphosphates or a complete fertilizer would be profitable. Most of the cleared areas afford good pasture (fig. 5). Carpetgrass is naturally suited, but lespedeza, white Dutch clover, and Dallisgrass may be successfully grown and are preferred for pasture if the carpetgrass can be controlled.

Areas of Mixed alluvial land with a sandy loam or clay loam subsoil that can be drained or partly drained offer possibilities for improved pasture. Excellent yields of corn, sugarcane, and hay could be obtained if the soil were properly drained, limed, and fertilized. The lower lying, more sandy areas are best suited to forest.





FIGURE 5.—Pasture on Mixed alluvium.

#### MYATT SERIES

The soil of this series, associated with the Kalmia, Cahaba, and Stough soils, is one of the most poorly drained on the stream terraces. It lies principally above overflow but is so flat that water stands on the surface for long periods after heavy rains. It developed from materials that were washed from acid upland soils of the Coastal Plain and deposited by streams at times of overflow.

The Myatt soil is deep, but it remains wet part of the year. It is used mostly for forest, range or pasture, and sorghum. Productivity is medium for pasture, but it can be improved somewhat by good management practices.

**Myatt loamy sand** (0 to 2 percent slopes) (Mb).—This soil, one of the most poorly drained soils in the county, occurs on stream terraces. It is waterlogged or saturated throughout winter and early spring. Most areas are nearly level or slightly depressional and retain water on the surface for some time following rainy periods. A few areas occur on very gentle slopes between the uplands and the adjoining first or second bottoms.

#### Profile characteristics:

##### Surface soil—

0 to 6 inches, gray friable loamy sand containing considerable organic matter in topmost part; weak medium granular structure; many of the dry areas are white or light gray.

6 to 24 inches, light-gray friable loamy sand or light sandy loam containing a few faint brown and yellow coarse mottles; essentially no structure.

##### Subsoil—

24 to 36 inches, gray friable sandy clay showing a moderate number of medium distinct pale-yellow and brown mottles; slightly sticky when wet; weak medium blocky structure.

##### Underlying material—

36 inches +, (wet) slightly plastic clay distinctly mottled yellow and reddish brown; this layer and the layer beneath it retard the downward movement of water and do not allow drying until late in the season.

This soil is fairly uniform, but a few areas, particularly in the vicinity of Elmore, have a much heavier subsoil than that described above.

This soil is strongly to very strongly acid, and with the exception of the topmost part of the surface soil, it is very low in organic matter. Fertility is low.

A few small areas of Leaf clay (not mapped separately in this county) are included that have a heavier surface and subsoil and are more sticky and plastic.

*Use and management.*—About 20 percent of Myatt loamy sand is cleared. It is used almost wholly for pasture and sorghum, since other crop yields are only fair. Carpetgrass is the dominant grass for grazing, and lespedeza, white Dutch clover, and Dallisgrass could be established if liberal quantities of basic slag or superphosphate are applied. Pasture crops do better on this soil in the dry summer season than on the associated better drained soils, as the land is almost perpetually moist. Open drainage ditches are preferable to tile drainage. The uncleared areas are occupied by a hardwood forest of sweetgum, water oak, post oak, and blackgum, intermixed with considerable pine. Excellent longleaf pines are growing in a few locations. Sesbania and benne, used for bird seed, do well on the better drained areas, as does sorghum. Sorghum yields are large, and the quality of the sirup is excellent.

#### ORANGEBURG SERIES

The soils of this series have yellowish-red to light-brown or red friable sandy surface soils and red friable to firm subsoils. The subsoils grade into stratified sand, gravel, and sandy clay about 4 to 6 feet below the surface. They are associated with Bowie, Faceville, and Red Bay soils and have been derived from beds of unconsolidated acid sand and clay of the Coastal Plain. They occupy nearly level to strongly sloping relief and are everywhere well drained.

The Orangeburg soils are deep to very deep. They are used mainly for field crops and forest; some areas are lying idle. Productivity for crops is low to medium but can be much improved by good soil management.

**Orangeburg fine sandy loam, slightly eroded phase<sup>5a</sup>** (0 to 5 percent slopes) (O<sub>A</sub>).—This soil differs from Red Bay sandy loam, with which it is closely associated, in having a lighter color and finer texture. Most of the relief is nearly level to gently sloping, but a few areas in the southeastern part have 5 to 8 percent slopes. Erosion can be controlled by careful terracing and proper farm management. All areas have slow to medium surface runoff and medium internal drainage.

##### Profile characteristics:

##### Surface soil—

0 to 12 inches, light brown (10YR 6/4) friable fine sandy loam; essentially structureless.

##### Subsoil—

12 to 40 inches +, dark red (2.5YR 3/6) friable fine sandy clay loam; moderate medium to coarse subangular blocky structure.

In a few places water-worn gravel, varying in diameter from ½ to 1½ inches, is present on the surface and mixed with the soil and subsoil. The gravel, where abundant, interferes slightly with cultivation, especially for cotton production. It tends to aid in cotton production, however, by causing the soil to drain out and warm earlier in spring.

<sup>5a</sup> Shown as Orangeburg fine sandy loam on map.

This soil is strongly acid, fair in organic-matter content, medium in fertility, and moderate to high in water-holding capacity. Permeability in the surface soil is moderately rapid, and in the subsoil moderate.

*Use and management.*—This soil is excellent for agriculture and about 82 percent of it is cleared for cultivation. Practically all of the cleared land is terraced where necessary. As this soil has light friable subsoil, it absorbs rainfall readily, is easily tilled, and gives up moisture freely to growing plants. It is therefore well suited to all locally grown crops and is responsive to good agricultural practices (fig. 6).



FIGURE 6.—Cotton and corn in 2-year rotation on Orangeburg fine sandy loam, slightly eroded phase.

**Orangeburg fine sandy loam, eroded phase (0 to 5 percent slopes) (OB).**—This phase differs from the slightly eroded phase in that it is more eroded and has a shallower surface soil over the red fine sandy clay or fine sandy clay loam. The depth of the surface soil, though chiefly shallow, is variable. In places the red subsoil is exposed; in others the surface depth is as much as 8 inches. The relief seldom exceeds 5 percent. Erosion is largely the result of previous poor management or of surface runoff during heavy rainfall when the subsoil could not readily absorb all the water. Surface runoff is slow to medium; internal drainage, medium.

The soil is strongly acid, medium in fertility, and low to fair in organic-matter content. It is moderately permeable and moderate in water-holding capacity.

*Use and management.*—About 87 percent of this soil is cleared, and all except the most eroded areas are cultivated. The cultivated soil is used largely for cotton, but small areas are in corn and hay crops. The eroded areas are used for pasture or remain idle. The yields are relatively low, owing to the droughty soil and the low fertilizer applications. Corn is generally planted on spots with deeper than average surface soil and fertilized with 100 to 200 pounds of nitrate of soda.

For most economical utilization, this soil should be carefully terraced and plowed deeply. In addition, legume crops should receive liberal

applications of phosphate, and large quantities of organic matter should be turned under.

**Orangeburg fine sandy loam, eroded sloping phase** (6 to 12 percent slopes) (Oc).—The eroded sloping phase differs essentially from the normal phase in having strongly sloping to rolling relief and severe sheet and considerable gully erosion. Owing to its eroded condition, the surface soil is not uniform in depth, color, or texture, and it is predominantly shallower than that of the normal phase. In many places all or the greater part of the original sandy surface soil has been removed, and the red fine sandy clay or fine sandy clay loam subsoil is exposed.

The largest areas are located in the northwestern and south-central parts of the county, and small areas are scattered in the eastern part. All areas are well drained, but runoff is rapid in many places. The soil is strongly acid. It is one of the most severely eroded soils among its associates. Many areas have been terraced but a large percentage of the terraces have not held. Where terracing has been improperly done, drainage water from the ridgetops causes severe damage by removing the surface soil. A few fields, such as the gravelly area 2 miles northwest of Robinson Springs, are well protected.

Included with this soil are approximately 400 acres of a gravelly phase on similar relief. The gravelly areas are not so erosive as the gravel-free areas but are just as productive. Although the gravel interferes somewhat with cotton chopping, it hastens crop maturity as a result of better soil aeration and drainage early in spring.

*Use and management.*—Even though about 58 percent of Orangeburg fine sandy loam, eroded sloping phase, is open land, very little is actually in cultivation. Small areas are being cultivated between gullies and eroded spots, but most cleared areas are idle and growing up in small pines and, in some instances, pasture grasses. The cultivated areas are used largely for cotton, corn, oats, and hay crops. Under common management low yields are usually obtained. Forested areas are composed principally of old-field pine, hickory, red and post oaks, and persimmon.

This soil is usually adjacent to better agricultural soils and its use for farm crops is not necessary. It can therefore be used for temporary pasture. Kudzu is a well-suited crop but becomes established slowly.

**Orangeburg gravelly fine sandy loam** (0 to 5 percent slopes) (Od).—This soil differs from the associated Orangeburg fine sandy loam in having a large quantity of small rounded quartz gravel in the surface soil and to some extent in the upper subsoil. The gravel, varying in diameter from  $\frac{1}{2}$  to as much as 2 inches, constitutes 20 to 40 percent of the surface soil and tends to interfere with cultivation. It retards erosion, however, and causes the soil to drain more readily and warm earlier in spring so that crops like cotton can be planted a few days earlier than on the other soils. It is a strongly acid soil. Slopes may be as much as 7 percent. Erosion can be controlled by careful terracing and proper management.

Profile characteristics:

Surface soil—

0 to 7 inches, very pale-brown or grayish-brown gravelly friable fine sandy loam; weak fine granular structure.



7 to 15 inches, dark-red or red friable fine sandy loam; essentially structureless.

Subsoil—

15 to 40 inches, red friable fine sandy clay; weak medium blocky structure.

40 to 48 inches, red firm sandy clay streaked and splotted with some light gray and yellow.

Parent material—

48 inches +, stratified sand, gravel, and clay; depth to this layer ranges from 4 to 6 feet.

Included are many small gravel-free areas and areas that are lighter colored than described above, being like Faceville gravelly sandy loam, thick surface phase.

*Use and management.*—Orangeburg gravelly fine sandy loam is adapted to a wide variety of crops. It is responsive to fertilizer, relatively easy to till except for the extremely gravelly areas, naturally well drained, and relatively easy to conserve with terraces. Fields are comparatively large, and medium to large machinery may be used. About 88 percent of the soil is cleared for cultivation, especially of cotton, corn, and hay crops. Under common management fair yields are obtained, but with improved management relatively high yields can be expected.

#### PHEBA SERIES

The Pheba soil has a light-gray to pale-yellow friable surface soil. It has a distinctly mottled friable subsoil. This is underlain by a very slowly permeable pan layer consisting of gray firm or cemented fine sandy clay distinctly mottled with yellow and reddish brown. The soil is derived from unconsolidated beds of acid sand and sandy clay of the Coastal Plain. It is strongly acid.

Depth to the pan layer is moderate (between 20 and 36 inches). The soil is used for field crops, forest, and pasture. Under common management productivity for most crops is usually low, but as a rule it is better in dry seasons. Productivity for pasture is medium. Under good management productivity for most crops and pasture can be raised to a somewhat higher level.

**Pheba fine sandy loam** (0 to 2 percent slopes) (PA).—This strongly acid soil differs from Bowie sandy loam in that it is somewhat poorly drained and has a cemented or compact pan layer below the subsoil. It also has a somewhat different crop adaptation. It occupies positions intermediate between Bowie sandy loam and Rains loamy sand, the largest areas being mapped in the western part of the county. Areas are small and practically level. Surface runoff is very slow to slow and internal drainage is slow. Ditches are usually required for successful crop production.

#### Profile characteristics:

Surface soil—

0 to 7 inches, light-gray to very pale-brown friable fine sandy loam containing a dark coloration of organic matter; weak fine granular structure.

7 to 20 inches pale-yellow friable fine sandy loam; essentially no structure.

Subsoil—

20 to 24 inches, light-gray or light brownish-gray friable fine sandy clay; some distinct, medium to coarse, gray and yellow mottles; weak medium blocky structure.



**Pan layer—**

24 inches +, gray firm or cemented fine sandy clay containing a moderate number of distinct medium mottles of yellow and reddish brown and having slow drainage; tends to be a hardpan when dry but is soft when wet; parent material, consisting of sand and sandy clay of the Coastal Plain, underlies this layer.

The organic-matter content and fertility of this soil range from fair to low, permeability is moderate in the surface soil and very slow in the pan layer, and water-holding capacity of the soil is moderate to moderately low.

A few small areas of Bowie and Rains loams are included. The Bowie spots are often used for cotton and the Rains for sorghum or soybeans.

*Use and management.*—Pheba fine sandy loam is very limited in extent. The cultivated areas are used largely for corn, hay crops, sorghum, oats, velvetbeans, and pasture; some cotton is grown on the better drained areas. Carpetgrass, white Dutch clover, Dallisgrass, and lespedeza do especially well if phosphate is applied. Good yields of crops are obtained during dry years, but in excessively wet seasons, especially in spring, crops are retarded. Sorghum yields are large and of excellent quality. Grain sorghum and soybeans do well. The forested areas are principally in sweetgum, blackgum, post oak, and old-field pine.

**RAINS SERIES**

The soil of the Rains series (formerly included in the Plummer series) is characterized by a poorly drained gray or dark-gray surface soil and light-gray, mottled with yellow and brown, subsoil. It has developed under poor drainage from beds of acid sands and sandy clays of the Coastal Plain and is closely associated with Bowie and Pheba soils. As it occupies the most poorly drained areas of the upland in the county, it requires artificial drainage for satisfactory crop or pasture production. The soil is strongly acid.

The Rains soil is moderately deep to deep. It is largely in forest. Some parts are used for pasture and field crops. Unless improved management practices, including drainage, are used, productivity for field crops is low.

**Rains loamy sand** (0 to 2 percent slopes) (RA).—This soil is associated geographically with the Bowie, Faceville, and Orangeburg soils of the uplands. Areas are small and scattered and are mapped mainly in the west-central part of the county. The soil occupies flat areas, swales, and slight depressions and receives the drainage and seepage waters from the surrounding higher soils. It is saturated during rainy seasons, and water stands over much of the surface for long periods after rains. Drainage ditches are required for its satisfactory use. It is similar to Myatt loamy sand, differing chiefly in that it occupies uplands, whereas the Myatt soil is on terraces or second bottoms.

**Profile characteristics:****Surface soil—**

0 to 6 inches, gray or dark-gray loose loamy sand; a considerable quantity of organic matter; weak fine granular structure.

6 to 30 inches, light-gray friable sandy loam or loamy sand; some yellow and brown distinct medium to coarse mottles; essentially no structure.

## Subsoil—

30 to 35 inches, light-gray friable heavy sandy clay; a moderate number of distinct medium mottles of yellow and brown; weak coarse blocky structure.

## Parent material—

35 inches +, sand and sandy clay of the Coastal Plain; depth to this layer varies somewhat.

The organic-matter content and fertility are fair to low, and water-holding capacity is moderate to moderately low.

*Use and management.*—Even though Rains loamy sand is a poorly drained soil, about 31 percent is cleared land used for pasture or crops, as much of it occurs in an area of excellent cropland soils where pasture land is much needed. It is naturally suited to pasture grasses, especially carpetgrass. Excellent grazing may be obtained if bushes and briars are kept out and the areas are prepared and fertilized with a liberal application of basic slag or an equivalent amount of lime and superphosphate and seeded to Dallisgrass, lespedeza, and white Dutch clover. As carpetgrass is only fair for pasture, the other grasses should be encouraged. Sorghum and sugarcane are well suited to this soil, as are corn, soybeans, and lespedeza where drainage has been provided.

## RED BAY SERIES

The soils of the Red Bay series are recognized as the reddest of the upland soils of the Coastal Plain area of the county. They have dark reddish-brown to dark-red friable surface soils and red friable sandy clay loam subsoils. They have developed from unconsolidated beds of acid sands and sandy clays of the Coastal Plain and are closely associated with Orangeburg, Faceville, and Bowie soils. The Red Bay soils are well drained.

These soils are deep to very deep. For the most part they are used for field crops. Productivity is usually medium to low under common management, but for cotton it is relatively high on some areas. Considerably increased productivity can be obtained under suitable soil management practices.

**Red Bay sandy loam** (0 to 5 percent slopes) (RB).—This, the reddest upland soil in the county, is similar to Amite fine sandy loam. The Amite soil, however, occurs on high terrace positions, 10 to 50 feet above overflow, whereas the Red Bay soil occurs on much higher positions on the original high flat surface of the Coastal Plain. The relief varies from nearly level to gently sloping. Surface runoff is slow to medium, and internal drainage is medium. The more sloping areas have been terraced. Owing to the friable sandy material that underlies the subsoil, deep gullies (some 25 to 50 or more feet deep) are eating back into the smooth areas of the soil.

## Profile description:

## Surface soil—

0 to 6 inches, dark reddish-brown friable sandy loam; weak medium granular structure.

6 to 15 inches, dark-red friable fine sandy loam; moderate medium to fine granular structure.

## Subsoil—

15 to 72 inches, red friable fine sandy clay loam; weak medium blocky structure.

## Parent material—

72 inches +, dark-red friable fine sandy clay loam containing much water-worn gravel; grades into reddish-yellow friable loamy sand.

A few small areas contain much water-worn gravel, which, however, does not seriously interfere with cultivation. It permits better aeration and causes the soil to warm earlier in spring.

This is a medium to strongly acid soil. It has a medium supply of organic matter and is medium to high in fertility. Water-holding capacity is moderate to high. Permeability in the surface soil is moderately rapid to moderate and in the subsoil moderate.

*Use and management.*—Red Bay sandy loam has good moisture conditions for crops and is well suited to all those commonly grown in the locality. All of it is cleared and lends itself favorably to a diversified cropping system. According to results obtained at the Prattville experiment field by the Alabama Agricultural Experiment Station, when cotton is fertilized with 600 pounds of 6-8-4 fertilizer the average yield over a period of 5 years is 1,117 pounds of seed cotton an acre. Other crops, including oats, soybeans, cowpeas, peanuts, lespedeza, sericea lespedeza, and pasture grasses, do well. The use of winter cover crops (especially vetch, Austrian winter peas, or crimson clover) or of summer legumes is beneficial.

**Red Bay fine sandy loam, eroded sloping phase** (6 to 12 percent slopes) (Rc).—This soil is more sloping and more eroded and requires more intensive and complex management practices to prevent erosion and conserve the soil than Red Bay sandy loam. The surface soil is much shallower because sheet erosion has removed part of it. In places shallow gullies have formed. Areas occupy relatively narrow elongated bodies on slopes in association with Red Bay sandy loam. Surface runoff is medium to rapid and internal drainage is medium. Susceptibility to sheet and gully erosion is medium to high, and careful soil-conserving practices are necessary. Most areas have been terraced, and erosion is being held to a minimum.

The soil is medium to strongly acid, medium in organic matter, medium to high in fertility, and moderately permeable.

*Use and management.*—Even though the eroded sloping phase of Red Bay fine sandy loam occurs on sloping relief, approximately 86 percent is being used annually for crops, principally cotton. A few small areas are in trees, largely old-field pine; a few other areas are idle or used for pasture. Under good management this soil gives relatively high yields of the commonly grown crops. Best yields are from cotton or oats, as they are not so exacting in moisture requirements during summer as corn and some other crops. Deep plowing and the incorporation of organic matter may restore the moisture-holding capacity of this soil so that it can produce large yields of all crops.

Sericea lespedeza is used to a small extent for temporary pasture or hay crops. Black locust grows well after getting established.

#### ROANOKE SERIES

The soil of the Roanoke series includes light-gray to dark-gray areas occurring on stream terraces along streams flowing through the Piedmont province. It is formed from sediments washed from soils of the Piedmont province. Water stands on most of the areas throughout winter.

The Roanoke soil is deep. It is mostly in forest and rangeland. Cleared areas are used largely for pasture. Productivity of the soil for field crops is very low unless improved management practices, including drainage, are used.

**Roanoke silt loam** (0 to 2 percent slopes) (Rd).—This poorly drained soil occupies positions along the Coosa, Tallapoosa, and Alabama River terraces in close association with Wickham, Altavista, and Augusta soils. Most areas are flat or slightly depressional. They are overflowed during high water, but not so frequently as the soils on the first bottoms. Many places are wet for several months, drying out late in summer. Occasionally ponds are present in these areas. During overflows deposits of brown silt may be left that gradually build up the soil. Areas in the vicinity of Wetumpka are above normal overflow.

**Profile characteristics:**

**Surface soil—**

0 to 7 inches, light-gray to dark-gray silt loam having weak fine-granular structure; a fairly large quantity of leaf mold and other organic matter.

**Subsoil—**

7 to 48 inches, light-gray firm smooth heavy silty clay; moderate number of brown and yellow distinct medium mottles; moderate medium to strong blocky structure; massive structure when soil is wet.

**Underlying material—**

48 inches +, alluvial sand, silt, and clay derived from soils of the Piedmont province.

The dominant texture is silt loam, but the range is from sandy loam to silty clay loam. In places there are recent deposits of brown silt loam 1 or 2 inches deep over the original gray surface soil. In other places organic matter makes the soil almost black.

This soil is strongly acid and low in fertility. It has a moderate water-holding capacity. Permeability in the surface soil is moderate to slow and in the subsoil very slow.

**Use and management.**—About 10 percent of Roanoke silt loam is cleared or supports only a few sweetgum, blackgum, and pine. Most of the cleared areas are used for pasture, and many have bushes growing on them (fig. 7). Where drainage is provided, sorghum, soybeans, lespedeza, and corn do well. Sorghum for silage or sirup is one of the best uses, and large yields are produced. Carpetgrass, Dallisgrass, white Dutch clover, and lespedeza are the major grasses and legumes. Applications of 400 to 600 pounds of basic slag annually or the equivalent in superphosphate and lime will improve their quality and yield.

The forested areas are principally of sweetgum, blackgum, water oak, elm, hickory, holly, maple, beech, and bay, with an understory of river canes and rattan vines. These areas are used for range land, and cattle and hogs are able to sustain themselves throughout most of winter and early spring.

**ROLLING AND HILLY LAND (COASTAL PLAIN MATERIALS)**

Rolling and hilly land (Coastal Plain materials) (6 to 30 percent slopes) (Rr) occurs over beds of sand, sandy clay, clay, and gravelly material. There is no uniform soil profile—most of the soil is merely parent material with a thin irregular sandy surface covering. Small



FIGURE 7.—Pasture growth on Roanoke silt loam; Augusta silt loam in background planted to corn.

rounded quartz gravel occurs in large quantities, and in places there are gravel hills and locally some iron crust. Relief is rolling or sloping to hilly, but for the most part it is hilly. Surface runoff and internal drainage are medium to rapid, and the soil is moderately well to excessively drained. Erosion is severe wherever the soil has been cultivated.

This land type, located in the northern, western, southwestern, south-central, and eastern parts of the county, includes areas too rough for practically any tillage. It occurs on narrow winding ridgetops flanked by rough broken slopes, deep V-shaped gullies, and extensive steeply rolling areas.

Reaction is strongly acid, organic-matter content is low, and fertility is low to very low. Water-holding capacity is moderately low to low.

In Elmore County many areas are included that consist of mixtures of Gilead, Susquehanna, Bowie, and Faceville soils—chiefly eroded rolling to hilly phases of gravelly types. Drainage is excessive, and erosion is active in spite of the forest cover.

*Use and management.*—Rolling and hilly land (Coastal Plain materials) is not suitable for tillage, but the few areas that have been cleared may be planted in kudzu for temporary pasture and erosion control. This land type is most useful for forest and a large part is now used for that purpose. Adequate measures to prevent fire are necessary for the reestablishment of a good loblolly, shortleaf, and longleaf pine forest cover in those areas where enough trees remain for reseeding (fig. 8). This land is suitable for game preserves, as enough underbrush and cane grow along the streams to support deer; and there are enough nuts, beggarweeds, mast, native vetch, and seeds of native lespedeza, French mulberry, dogwood, and other plants for the feeding of quail and turkeys. A few small better areas grow cotton and corn.





FIGURE 8.—Young pines on rolling and hilly land (Coastal Plain materials).

#### ROUGH BROKEN LAND (CECIL SOIL MATERIAL)

Rough broken land (Cecil soil material) (15 to 60 percent slopes) (Rf) consists of extremely broken, steep, and hilly areas in the northern and northeastern parts of the county and east of Eclectic. The surface soil is variable, ranging from brown to gray in color and from gravelly sandy loam to clay loam in texture. It is underlain by red firm stiff clay. The depth of the soil over rock is variable. About two-fifths of the soil is gravel-free; the rest contains gravel of angular quartz fragments. Granite or gneiss rock, varying in size from a few inches to several feet but usually ranging from 10 to 24 inches in cross section, occurs on the surface and in the soil in many places. As slopes vary from 15 to 60 percent, erosion is severe in open areas and active in thinly forested areas, especially those that are burned over.

*Use and management.*—Most of the Rough broken land (Cecil soil material) that is cleared is used for pasture. It produces good lespedeza for grazing during spring and early fall. Kudzu is grown for erosion control on some areas (fig. 9).

Most of the soil is now in its best use—forest (fig. 9, B). Adequate measures to prevent fires are practically the only requisite for re-establishment of good loblolly, shortleaf, and longleaf pine in areas where enough trees remain to afford stock for reseeding. Trees such as sweetgum, hickory, post and red oaks, poplar, and other hardwoods, in addition to pine, constitute the present forest growth. Most of the merchantable timber has been cut. This land is also suitable for game preserves, as enough underbrush and cane grow along the streams to support deer, and enough nuts, beggarweed, mast, native vetch, and seeds from native lespedeza, French mulberry, and dogwood are available for quail and turkey.

#### ROUGH STONY LAND

Rough stony land (6 to 40 percent slopes) (Rg) includes areas of rough, broken, or steep land on which many outcrops of solid rock and a large quantity of loose stones occur. The stones range in size from



FIGURE 9.—A, East of Wetumpka on State Prison Farm: Kudzu on Rough broken land (Cecil soil material) in foreground; Rolling and hilly land (Coastal Plain materials) in background. B, Pines on Rough broken land (Cecil soil material) near lock 18, north of Wetumpka.

a few inches to large boulders several feet in diameter. Drainage is excessive, and erosion is active in most areas in spite of the forest cover.

*Use and management.*—Rough stony land is not suitable for tillage; most of it is in forest of oak, hickory, sweetgum, and pine. If adequate measures are taken to prevent fire, a good loblolly, shortleaf, and longleaf pine forest can be reestablished in areas where enough trees remain to furnish stock for reseeding. There is enough underbrush and cane along the streams to support deer, and enough nuts, beggarweed, mast, native vetch, and seeds to feed quail and turkey.

## SAWYER SERIES

The soil of the Sawyer series is a light yellowish-brown fine sandy loam with an upper subsoil of brownish-yellow friable silty clay loam. The lower subsoil is brownish-yellow firm silty clay loam that is slightly plastic when wet. The Sawyer soil has developed from thick beds of acid clays and fine sandy clay loams of the Coastal Plain. Relief is level to gently sloping. Because of slow internal drainage, the soil is only moderately well drained.

This soil is deep. It is used principally for field crops and forest. Productivity for crops is generally low, but it can be greatly improved by use of good soil management practices.

**Sawyer fine sandy loam** (0 to 5 percent slopes) (SA).—Although associated with Susquehanna clay, this soil has a deeper more friable surface soil and a better developed upper subsoil. The slopes seldom exceed 3 or 4 percent. They are relatively uniform, permitting easy terracing and utilization of farm machinery. Surface runoff is slow to rapid and internal drainage slow. Erosion hazard is slight to high.

Profile characteristics:

Surface soil—

0 to 6 inches, light yellowish-brown very friable fine sandy loam; weak fine granular structure.

Subsoil—

6 to 15 inches, brownish-yellow friable silty clay loam; weak fine blocky structure.

15 to 30 inches, brownish-yellow firm smooth silty clay loam, slightly plastic when wet; moderate fine to medium blocky structure.

Parent material—

30 inches +, brownish-yellow firm heavy clay, plastic when wet; many red and light-gray distinct medium mottles; strong medium blocky to massive structure; at 40 to 60 inches small scales of mica give a friable to slick feel.

This soil is strongly acid, fair to low in organic matter, and low to medium in fertility. The surface soil is moderately permeable and the subsoil slowly permeable. Water-holding capacity is moderate to moderately low.

A few small areas of Susquehanna fine sandy loam are included, but these areas are not so productive as Sawyer fine sandy loam and are more difficult to cultivate.

*Use and management.*—As tillage, moisture conditions, and response to fertilizer and other good management practices on Sawyer fine sandy loam are favorable, the soil is well suited to a wide variety of crops.

Approximately 73 percent is cleared, largely for cotton, corn, oats, and sorghum. Average yields are good under good management. When corn follows a legume crop, yields are satisfactory without the addition of fertilizers. Judging by results obtained on a similar soil by the Alabama Agricultural Experiment Station, this soil is especially well suited to sericea lespedeza. The land in forest supports principally old-field pine and sweetgum.

## SHUBUTA AND BOSWELL SERIES

The soils of the Shubuta series have dark-gray to light-gray to yellowish-brown sandy surface soils and reddish-brown to yellowish-red compact clay or sandy clay subsoils. They are derived from beds



of clay, sandy clay, and gravelly sandy materials of the Coastal Plain. In color they resemble the Faceville soils, but their subsoils are heavier and thinner and their parent materials are heavier and more variable. Relief varies from nearly level to strongly sloping. The soils are moderately well drained.

The Boswell soils are light-gray or grayish-brown to pale-yellow upland soils of the Coastal Plain. Their subsoils are red firm to very firm heavy clay. The Boswell soils are redder in the subsoil and have a greater degree of horizon differentiation than the Susquehanna soils. They are usually redder and have more fine material in the subsoil than the Shubuta soils. They have developed from thick beds of acid sandy clays and clays on gently undulating to rolling slopes. They occur in association with Shubuta, Susquehanna, and Faceville soils. The Boswell fine sandy loam is the only member of the series in this county and it is mapped with Shubuta fine sandy loam. The Boswell soils are moderately well to somewhat poorly drained. Both the Shubuta and Boswell series were included in the Susquehanna series in the older soil surveys.

The soils of the Shubuta and Boswell series are deep to very deep. They are used principally for field crops, pasture, and forest. Productivity for field crops is low, but it can be considerably increased in the best areas by careful use of soil-improvement practices. Fairly good pasture can be grown on the better sites if proper management practices are used.

**Shubuta fine sandy loam** (2 to 7 percent slopes) (S2).—This soil differs from the soil of the Susquehanna series in that it is less mottled in the subsoil, is more compact, and is not so sticky and plastic. It occurs on undulating to sloping relief (averaging about 4 percent). Surface runoff is medium to rapid, and internal drainage slow. Both sheet and gully erosion are severe when the soil is used for clean-cultivated crops. As erosion has been active on most of the soil, the surface depth is variable. In most places the surface soil is 6 to 10 inches thick, but in some places it is completely removed and the subsoil is exposed.

**Profile characteristics:**

**Surface soil—**

0 to 5 inches, dark-gray to light-gray or light brownish-gray friable fine sandy loam; weak fine granular structure.

5 to 8 inches, yellowish-brown friable fine sandy loam or loamy sand; essentially no structure.

**Subsoil—**

8 to 20 inches, reddish-brown to yellowish-red compact tough heavy clay or sandy clay, which cracks upon drying, is brittle, and breaks into irregularly shaped small hard lumps of strong medium blocky structure.

**Parent material—**

20 inches +, distinctly mottled yellow and gray friable sandy clay grading into strata of fine sand and gravel at 4 to 6 feet.

This soil is strongly acid, low in organic-matter supply and fertility, and moderately low in water-holding capacity. The surface soil is moderately permeable and the subsoil slowly permeable.

**Use and management.**—Approximately 78 percent of Shubuta fine sandy loam is cleared for cultivation, but not all of this is cultivated annually. Several small cleared areas have been damaged by erosion and are unsuited to cultivation. A few abandoned areas are growing

broomsedge, old-field pine, sweetgum, lespedeza, carpetgrass, and Dallisgrass. Some parts of these areas are being used for pasture, even though a limited quantity of grazing is obtained. The forested areas grow largely old-field and shortleaf pines, sweetgum, and post oak.

Cotton and corn are the principal crops, but small acreages of hay crops and oats are grown. The low yields result from the heavy nature of the soil that makes it droughty and subject to severe erosion, the low fertilizer applications, and the lack of sufficient horsepower to prepare the land properly before planting.

Conservation is difficult in many areas. Carefully constructed and maintained terraces and a cropping system to check the movement of water are essential. On the more sloping positions sericea lespedeza would be advantageous. On the more gentle slopes, clean-tilled crops, in rotation with such cover crops as vetch or Austrian peas, could be used satisfactorily.

**Shubuta and Boswell fine sandy loams** (0 to 5 percent slopes) (SB).—This undifferentiated unit is composed of Shubuta fine sandy loam and Boswell fine sandy loam. The undulating to sloping relief and tight heavy subsoil of both the Shubuta and Boswell fine sandy loams cause rapid runoff and erosion in many places. Areas where surface soil is completely removed and the tight heavy reddish-brown to red clay is exposed are either idle or planted to cotton or oats. Other places, particularly at bases of slopes or in small swales where the surface soil from the eroded areas has accumulated, are productive and grow corn and hay. Both sheet and gully erosion are severe where clean-cultivated crops are grown. Little terracing has been done. A profile of Shubuta fine sandy loam has been described elsewhere. The following is a profile of Boswell fine sandy loam:

Surface soil—

0 to 3 inches, light-gray to grayish-brown very friable fine sandy loam; weak fine granular structure.

3 to 8 inches, very pale-brown or pale-yellow very friable fine sandy loam; essentially no structure.

Subsoil—

8 to 16 inches, red firm to very firm heavy clay; moderate to strong medium blocky structure.

Parent material—

16 to 50 inches, mottled red and brownish-yellow heavy clay, the red decreasing with depth; very stiff and firm to very firm; strong medium blocky structure.

50 inches +, light brownish-gray or light-gray acid clay.

This soil unit is strongly acid, low in organic matter and fertility, and moderately low in water-holding capacity. In the less eroded areas, permeability in the surface soil is moderate; in the more eroded areas, it is moderately slow or slow. The subsoil is slowly to very slowly permeable.

*Use and management.*—Less than 35 percent of the cleared areas of Shubuta and Boswell fine sandy loams is used annually for tilled crops, principally cotton and corn. Many open areas are abandoned for crop production and are now in broomsedge, lespedeza, old-field pine, and sweetgum or used for pasture land. Lespedeza, Dallisgrass, and carpetgrass supply fair grazing during spring and early fall. The



principal trees on uncleared areas are old-field, shortleaf, and longleaf pines, sweetgum, and post oak.

At one time terraces were constructed on many of the areas, but they were not sufficiently high and wide and did not hold. A relatively small percentage of the soils is still protected sufficiently by terraces. Little fertilizer is used, and available machinery and tools are insufficient for proper tillage. The areas are farmed largely by tenants. Because of poor management and susceptibility to erosion, low yields are obtained.

Much experimental work is being done on the soils composing this unit by the Alabama Agricultural Experiment Station, and results indicate that they are well suited to sericea and the annual lespedezas.

**Shubuta and Boswell fine sandy loams, sloping phases** (6 to 12 percent slopes) (Sc).—These soils are more sloping and more eroded and have thinner (3 to 6 inches) fine sandy loam surface layers than the normal phases. The sloping relief and the slow water-absorbing capacity of the subsoils cause rapid runoff and result in severe erosion. This is especially true in tilled areas, but forested areas that are burned over regularly are also susceptible. These soils are strongly to very strongly acid and low in organic matter and fertility. Their profiles, except for the eroded surface layers, are similar to those of Shubuta fine sandy loam and Boswell fine sandy loam. Small areas of Susquehanna clay and a few areas having a 6- to 8-inch surface covering are included with these soils.

*Use and management.*—Approximately 78 percent of Shubuta and Boswell fine sandy loams, sloping phases, is in forest, largely old-field and shortleaf pines, sweetgum, and post oak. The open areas are used for pasture, but a small percentage is in row crops. These soils are well suited to lespedeza; carpetgrass and Dallisgrass do well on the lower slopes.

The row crops are planted on small areas, usually less than 5 acres in size, where erosion is least severe. Cultivated areas are therefore scattered and interspersed with small areas of pines and sedgegrass. Cotton, lespedeza, and oats give fair yields, and according to results obtained on a similar soil at the experimental field at Tuskegee (in Macon County) sericea lespedeza should yield well. Corn is not well suited. The use of superphosphate or basic slag for lespedeza is encouraged; 300 pounds or more of 6-8-4 or some other high-grade fertilizer is recommended for cotton, and 100 to 200 pounds of nitrate of soda for oats or corn.

#### STOUGH SERIES

The Stough soil has a gray or light brownish-gray surface soil and a light-gray or pale-yellow subsoil distinctly mottled in the lower part. Beneath the subsoil is a slowly permeable pan layer of compact or feebly cemented distinctly mottled fine sandy clay. The soil developed from materials washed from acid soils of the Coastal Plain, brought down and deposited by the streams when they flowed at higher levels. It is on flat areas on the second bottoms or terraces and is somewhat poorly drained. Stough fine sandy loam is associated with the Kalmia and Myatt soils.

The soil is moderately deep to the pan layer. It is used for pasture, forest, and field crops. Productivity for field crops is low, but with adequate drainage and other suitable management, it can be improved. Under prevailing management, pasture productivity is usually medium, but it can be considerably increased by better management practices.

**Stough fine sandy loam** (0 to 2 percent slopes) (Sd).—This soil is intermediate in drainage and profile development between Kalmia sandy loam and Myatt loamy sand. It occupies practically level to slightly depressional positions. Surface runoff is very slow to slow, and internal drainage is slow. Drainage ditches are necessary if the areas are to be used for successful production of row crops.

**Profile description:**

**Surface soil—**

0 to 5 inches, gray or light brownish-gray friable fine sandy loam having a dark coloration of organic matter in the upper part; weak fine granular structure.

5 to 13 inches, pale-yellow or very pale-brown friable fine sandy loam; essentially no structure.

**Subsoil—**

13 to 24 inches, light-gray or pale-yellow friable fine sandy clay containing some distinct medium mottles of gray and reddish-brown in the lower part; moderate medium blocky structure.

**Pan layer—**

24 inches +, compact or feebly cemented but fairly brittle fine sandy clay distinctly mottled yellow, gray, and brown; underlain at variable depths by alluvial material derived from soils of the Coastal Plain uplands.

This soil is somewhat variable; characteristics resemble those of Kalmia sandy loam in the better drained parts, and those of Myatt loamy sand on the low-lying wet parts.

This is a medium to strongly acid soil. It is usually low in organic matter and has low fertility and a moderately low water-holding capacity. Permeability is moderate in the surface soil and slow in the subsoil and pan layer.

*Use and management.*—A large part of the 60 percent of Stough fine sandy loam that is cleared is in pasture. Corn, sorghum, soybeans, lespedeza, and pasture grasses may be grown successfully on the drained areas; pasture grasses (principally carpetgrass), sweetgum, and old-field pine are the principal vegetation on the undrained areas. This soil is seldom used for cotton. Since the soil does not receive phosphate and potash from cotton fertilization, corn, sorghum, oats, and other crops need a complete fertilizer. For pasture grasses 2 or 3 tons of lime and a liberal application of phosphate and potash are necessary. Carpetgrass tends to choke out other pasture grasses, especially where mineral fertilizer is not applied.

**SUSQUEHANNA SERIES**

In uneroded areas the Susquehanna series is characterized by a light-gray sandy surface soil. In this county most of the original surface soil has been removed by erosion and the plow layer consists mainly of subsoil material. The subsoil is reddish-brown firm clay distinctly mottled with gray and yellow. The soil is developed from thick beds of heavy acid clays of the Coastal Plain. Relief ranges from sloping to hilly.

The Susquehanna soil is moderately deep to deep. Most of it is in forest. Productivity for the few field crops is low to very low. Improvement in yields can be expected under good management. Pasture is grown to some extent, and with suitable management fairly good stands are obtained.

**Susquehanna clay** (6 to 15 percent slopes) (SE).—This heavy (sticky when wet) clay or clay loam soil on sloping to hilly topography has a shallow reddish-brown clayey surface soil or plow layer over a reddish-brown firm (plastic when wet) clay subsoil mottled with gray and yellow. Below 30 or 40 inches, the material consists of clay, fine sand, and mica scales. Surface runoff is medium to very rapid, and because of the impervious character of the clay subsoil, internal drainage is very slow. The hazard of erosion is high to very high on clean-cultivated areas. A dark-gray sand or sandy loam covering was on many areas when first cleared of timber, but since little care was taken to prevent erosion, it was soon removed. A few patches of the sandy surface still remain on some areas.

This soil is strongly acid, very low in organic matter and fertility, and moderately low to low in water-holding capacity. The surface soil is slowly permeable, and the subsoil very slowly permeable.

*Use and management.*—Approximately 15 percent of Susquehanna clay is cleared. The timber was removed in most instances so that the areas could be farmed, but cultivation was discontinued because of the tough, sticky character of the soil and its susceptibility to erosion. A large percentage of the cleared soil is used for pasture (fig. 10) because of its suitability for lespedeza, carpetgrass, and Dallisgrass. The small percentage still in tilled crops is chiefly in cotton.

Results obtained on a similar soil by the Alabama Agricultural Experiment Station indicate that this soil is well suited to sericea lespedeza for hay and erosion control. The areas in timber should



FIGURE 10.—Pasture on Susquehanna clay near New Style School, 5 miles east of Wetumpka; pines in background.

remain so. The soil is especially well suited to the production of old-field pines. If measures are taken to prevent fires, a good loblolly and shortleaf pine forest cover could be reestablished. Longleaf and slash pines generally require planting, and other pines become more quickly established if planted rather than left to natural reseedling. This land is suitable for game preserves, as there is enough underbrush and cane along streams to support deer, and enough nuts, beggarweed, mast, native vetch, and seeds to feed quail and turkey.

#### SWAMP

Swamp (Sf) consists of permanently wet, often ponded, areas that grow principally cypress, bay, and tupelo. The soils composing Swamp are somewhat variable in texture and color, but generally they are gray silt loams or silty clay loams and are underlain by gray, or gray mottled with brown or yellow, silty clay loams. In places there is a shallow covering of organic matter.

Although a few of the smaller areas may be drained at relatively small cost, it is not economically feasible to drain most areas for crop production. Most of this land is subject to flooding during prolonged rainy periods. Practically all areas will make excellent pasture if drained, fertilized, and seeded; the better drained parts could be used for fall gardens.

#### VAIDEN SERIES

The soil of the somewhat poorly drained Vaiden series has a yellowish-brown clay surface soil and a light yellowish-brown firm clay subsoil mottled with strong brown and light gray. It is derived from thin beds of clays over the Selma chalk formation or influenced by or developed from materials of this formation in the Coastal Plain. It is part of the Black Belt group of soils. Relief varies from gently sloping to moderately sloping.

The Vaiden soil is very deep. Most of it is in forest; the rest is mainly in pasture. Productivity for pasture is medium under common management, but it can be increased somewhat by better management practices.

**Vaiden clay** (5 to 9 percent slopes) (VA).—The surface soil and upper subsoil of Vaiden clay are acid, but the lower part of the subsoil is neutral and grades into calcareous material. Surface runoff is medium to rapid, and internal drainage slow. The sloping relief and the heavy clay surface retard absorption of water and cause severe erosion when the soil is used for row crops. Some areas have severe sheet and gully erosion even though they are covered with a scant growth of timber or grass.

##### Profile characteristics:

##### Surface soil—

0 to 4 inches, yellowish-brown friable to firm clay, sticky when wet; weak fine blocky structure.

##### Subsoil—

4 to 30 inches, light yellowish-brown firm clay, plastic when wet; many fine distinct strong-brown and light-gray mottles; moderate fine to medium blocky structure; a few brown concretions.

30 to 60 inches, light yellowish-brown firm clay, plastic when wet; mottles the same as in the overlying layer; strong medium blocky structure.

##### Parent material—

60 inches +, pale-yellow clay; many medium distinct white and brownish-yellow mottles; some soft lime nodules.

Narrow belts of Vaiden sandy loam occur on the outer edges where this soil grades into the surrounding sandy soils.

Vaiden clay is low in organic matter and low to medium in fertility. It is slowly permeable throughout and has a moderately low water-holding capacity.

Included are a few small areas of Susquehanna clay that could not be separated from this soil.

*Use and management.*—Even though most of Vaiden clay has been cultivated at one time, only 20 percent is now cleared. This is due to its susceptibility to erosion and its poor tilth conditions. Forested areas are largely in old-field and shortleaf pines, sweetgum, and post oak. Trees, particularly old-field pine, make rapid growth when they are thinned properly and fire is kept out.

The cleared areas are used for pasture land, as they are well suited to lespedeza, white Dutch clover, Dallisgrass, and carpetgrass. Good pasture can be developed by fertilizing with phosphate, liming, and seeding to lespedeza, sericea lespedeza, Dallisgrass, and white Dutch clover.

#### VANCE SERIES

These soils have light yellowish-brown to gray sandy upper surface soils and brownish-yellow lower surface soils. The subsoils are reddish-yellow firm sandy clay or very firm clay, distinctly mottled in the lower part in some areas. These soils resemble the Appling soil, but they have a much heavier upper subsoil and erode more easily on the same slope gradient and under similar soil treatment. They are derived from the weathered products of porphyritic and aplitic granites and are influenced locally by materials from mica schist. They have nearly level to rolling relief and are moderately well to somewhat poorly drained.

The Vance soils are moderately deep to deep. They are used principally for field crops, forest, and pasture; some areas are lying idle. Productivity for most field crops is medium to low, but it is medium for cotton on some of these soils. The productivity level can be raised considerably by improved soil management practices. Productivity for pasture is medium to low, but with suitable management practices it can be increased somewhat.

**Vance coarse loamy sand** (0 to 6 percent slopes) (VB).—The small, elongated, and irregularly shaped areas of this soil are located in the northeastern part of the county. It has a coarse sandy surface soil, since it is derived from a coarse-grained granite. Surface runoff is slow to rapid, and internal drainage is slow. The soil occurs on long, narrow, winding ridgetops and has nearly level to gently sloping relief. The irregularly shaped areas create a problem in the construction and maintenance of terraces. The more sloping sections are subject to much sheet and gully erosion.

Profile description:

Surface soil—

0 to 7 inches, light yellowish-brown loose coarse loamy sand; weak fine granular structure.

7 to 12 inches, brownish-yellow friable coarse sandy loam; essentially no structure.



## Subsoil—

12 to 36 inches, reddish-yellow firm compact heavy coarse sandy clay; red distinct medium mottles common in the lower part; strong medium to coarse blocky structure.

## Parent material—

36 inches +, mixed light-gray, dark grayish-brown, and yellowish-red disintegrated coarse-grained granite containing small scales of mica.

Small areas of very fine gravelly loam, somewhat coarser than the soil described above, are included in a few locations.

Soil reaction is strongly acid, organic-matter content and fertility are low, and the water-holding capacity is moderately low. Permeability is moderately rapid in the surface soil and moderately slow to slow in the subsoil.

*Use and management.*—About 64 percent of Vance coarse loamy sand is cleared or has only a small amount of forest growth. Some of this, however, is not cultivated annually; many areas are idle or used for pasture year after year. Many of the idle areas are in sedge-grass, small sweetgum, and scattered old-field pine. The forested areas grow largely old-field and shortleaf pines, sweetgum, hickory, and post and red oaks.

Cotton, corn, oats, and hay, the principal crops, give fair average yields. Liberal fertilizer applications and the use of legumes are most important for satisfactory yields.

As this soil requires careful management that will conserve and maintain its productive capacity, more attention is being given to growing of erosion-control and soil-building crops along with clean-cultivated crops. It is important that erosion be held in check and that organic matter be added by growing legume crops, if the soil is to produce most economically. *Sericea lespedeza* is being used on some areas for erosion control and as a hay or temporary pasture crop.

**Vance coarse sandy loam, rolling phase** (7 to 12 percent slopes) (Vc).—This soil is more sloping to rolling and is more eroded in open areas than Vance coarse loamy sand. Sheet erosion and gullying have removed part of the original sandy covering; as a result texture and depth of the surface soil are less uniform and the heavy compact clay subsoil is exposed in places. In some places the disintegrated rock is nearer the surface than on Vance coarse loamy sand. Most areas are gravel-free, but a few have angular quartz gravel on and in the surface soil. The largest areas of this phase occur in the northeastern part of the county. The soil is strongly acid. The relief is sloping to strongly sloping or rolling. The slopes are complex. Terraces are difficult to construct and maintain, but they are essential for cultivation of clean-tilled crops. The relief and the slow water-absorbing capacity of the subsoil are responsible for the severe sheet and gully erosion.

*Use and management.*—Only 25 percent of Vance coarse sandy loam, rolling phase, is cleared; the rest is in forest of old-field pine, shortleaf pine, post oak, hickory, and sweetgum. Open areas or fields, seldom exceeding 5 acres in size, are largely idle or used for pasture, but some are used for row crops or *sericea lespedeza*. The soil is difficult to farm because of sloping relief and irregularly shaped fields. Short crooked rows are necessary, especially if the areas are terraced. Terracing, however, is seldom done, and erosion hazard is high to very

high. Cotton, corn, oats, and soybeans are the major row crops grown, and yields are fair. The cultivated areas are on the more gentle slopes where erosion is less severe. *Sericea lespedeza* is gaining in importance as an excellent soil-conserving crop and a temporary pasture or hay crop.

**Vance gravelly sandy loam** (2 to 7 percent slopes) (Vd).—The largest areas of this soil are located in the northern and northeastern parts of the county on relatively narrow elongated ridgetops and short slopes. It is a sandy soil of the Piedmont province, similar to Appling soil but more compact and more blocky in structure. Surface runoff is slow to rapid and internal drainage is slow. Terracing and erosion control are difficult, and short crooked rows are necessary to conform with the terraces. The heavy subsoil and the sloping and rolling topography are conducive to excessive erosion on the more sloping areas. This allows the heavy subsoil to bake, and a droughty condition for crops such as corn results.

**Profile characteristics:**

**Surface soil—**

0 to 6 inches, light yellowish-brown friable sandy loam containing a small quantity of organic matter; weak fine granular structure; many angular quartz fragments, varying from  $\frac{1}{2}$  to 5 inches in diameter, are present on and in the soil.

**Subsoil—**

6 to 8 inches, brownish-yellow or pale-yellow friable sandy clay having moderate medium blocky structure; some angular quartz fragments.

8 to 30 inches, very firm compact reddish-yellow heavy clay; strong coarse blocky structure; a few small mica flakes.

**Parent material—**

30 inches +, mixed light-gray, dark grayish-brown, and yellowish-red disintegrated granite and gneiss rock.

This soil is strongly acid, low in fertility, and moderately low in water-holding capacity. Permeability is moderately rapid in the surface soil and moderately slow to slow in the subsoil.

In the vicinity of Buyck this soil is a fine sandy loam, but it has the same agricultural uses as the gravelly sandy loam.

**Use and management.**—About 58 percent of Vance gravelly sandy loam is cleared, but most of it is idle. Much has been abandoned because of erosion and has grown up in sedgegrass, briers, and old-field pine. Probably not more than 40 percent of the total cleared area is cultivated annually. The forested tracts grow principally old-field and shortleaf pines, post oak, sweetgum, hickory, and some red oak.

Cotton, corn, oats, and hay give fair yields. Oats grow during spring when moisture is plentiful, and cotton withstands dry summer periods better than other clean-tilled crops. Fields are small, and those terraced have short crooked rows. The use of *sericea lespedeza* for erosion control and for hay or temporary pasture is increasing.

**Vance gravelly sandy loam, rolling phase** (6 to 12 percent slopes) (V<sub>E</sub>).—This phase is more sloping or rolling and more eroded in open areas than the normal phase. In addition it has a surface soil that is less uniform in texture or depth and a subsoil that in many places is less thick over the underlying rock materials. This strongly acid soil occurs in scattered areas in the northern and northeastern parts of the county. In some places Cataula soils having red subsoils are included with it. Its relief varies from gently sloping to strongly

sloping or rolling. Relief and slow water-absorption capacity of the subsoil cause rapid to very rapid surface runoff and lead to severe erosion. Terraces are difficult to construct and maintain.

*Use and management.*—Approximately 75 percent of Vance gravelly sandy loam, rolling phase, is in forest of old-field and shortleaf pines, hickory, sweetgum, and post oak. Half of the rest is idle land, some is in pasture, and small areas are used for row crops and for kudzu and other soil-conserving crops. Kudzu, the best erosion-control crop for this soil, may be used for temporary grazing or as a hay crop.

Fair yields of cotton, corn, oats, and soybeans are produced on the areas where erosion is less severe.

**Vance loamy sand** (2 to 6 percent slopes) ( $V_F$ ).—The deeper sandy surface soil over the compact subsoil gives this phase better moisture relations than those of the other members of the series with shallower surface soils. The surface and the upper subsoil are somewhat similar in color to Bowie sandy loam. Slopes average 3 to 4 percent. Surface runoff is slow to medium; internal drainage is slow. Even though many areas have been terraced, they can be farmed fairly satisfactorily with power machinery, as fields have simple rather than complex slopes. This soil occurs in scattered areas in the northwestern part of the county.

Profile characteristics:

Surface soil—

0 to 6 inches, gray loose loamy sand containing a small quantity of organic matter; weak fine granular structure.

6 to 10 inches, brownish-yellow or pale-yellow friable sandy loam to loamy sand; essentially no structure.

Subsoil—

10 to 15 inches, yellow friable sandy clay; moderate medium blocky structure.

15 to 40 inches, very firm compact heavy clay ranging in color from pale yellow to reddish yellow; some distinct medium mottles of shades of yellow, red, and brown in the lower part; strong medium to coarse blocky structure.

Parent material—

40 inches +, mixed light-gray, dark grayish-brown, and yellowish-red disintegrated granitic rock.

This strongly acid soil is low in fertility and has a moderate water-holding capacity. Permeability in the surface soil is moderately rapid and in the subsoil moderately slow to slow.

Included in the mapping are many areas that have a red subsoil, and small areas of Vance coarse loamy sand. These inclusions do not affect the agricultural use of the soil.

*Use and management.*—Vance loamy sand has fairly good moisture conditions for crops and wide crop adaptation. It is easily tilled, responsive to good management, and suited to almost any cropping system. Approximately 60 percent of it is cleared. The principal crops—cotton, corn, and hay—give good yields under good management. Forested areas are chiefly in old-field pine, post oak, sweetgum, and a few longleaf pine.

#### WEHADKEE SERIES

The Wehadkee soil is a light-colored poorly drained soil with a mottled subsurface. It occurs on first bottoms along streams in and flowing out of the Piedmont province. The materials giving rise to it have

been washed from soils in the Piedmont province. It is subject to frequent overflow.

The soil is deep, but the water table is high. Nearly all of it is used for forest and rangeland pasture.

**Wehadkee silt loam** (0 to 2 percent slopes) (WA).—Areas of this gray poorly drained soil occur in close association with Congaree silt loam on the river bottoms. All of it is located along the Coosa, Tallapoosa, and Alabama Rivers. Artificial drainage is required for cultivation. The soil is subject to overflows, especially in winter, and water may stand for periods of 4 to 6 months on some areas.

Profile characteristics:

Surface soil—

0 to 7 inches, light-gray to gray friable silt loam; a considerable quantity of leaf mold and other organic matter in the upper part; weak fine crumb structure.

Subsurface—

7 to 48 inches, light-gray firm silty clay or silty clay loam containing many distinct medium to coarse mottles of brown, yellow, and gray; this layer usually extends to depths of 6 or more feet before a change is apparent.

In a few locations small areas having a fine sandy loam surface soil are included, but these areas have the same uses as the silt loam.

This is a strongly acid soil. It is moderate to low in organic matter and high in fertility. Water-holding capacity is high. The surface soil is slowly permeable, and the subsurface layer is very slowly permeable.

*Use and management.*—Practically all of Wehadkee silt loam is in forest and rangeland pasture. The principal vegetation is sweetgum, blackgum, water oak, ash, beech, hickory, elm, holly, river canes, rattan vines, and underbrush. A large quantity of nuts is produced, making a good range for hogs. River canes and other underbrush afford winter browse for cattle. The few cleared areas, where drained, are used for sorghum, pasture, or corn. Carpetgrass, Dallisgrass, white Dutch clover, and lespedeza are the major forage plants. A large tonnage of sorghum may be obtained when the soil is adequately drained. Grain sorghums, hegari and sagrain, deserve consideration on drained areas because they mature quickly.

#### WICKHAM SERIES

The soils of this series occur in association with Altavista, Augusta, and Roanoke soils on stream terraces in the Piedmont province and follow the streams some distance into the Coastal Plain. They were derived from sediments washed from soils in the Piedmont province, but in places slight amounts of local Coastal Plain materials have been added. They are reddish-brown or brown well-drained soils with yellowish-red or brown subsoils. Some areas are subject to overflow during extremely high water. Most are nearly level to undulating, but a few adjacent to streams are gently sloping to sloping.

The Wickham soils are deep. They are used principally for field crops, pasture, and forest. Productivity for field crops is medium to low. Increased productivity can be obtained through improved soil management practices.

**Wickham fine sandy loam** (0 to 3 percent slopes) (Wc).—This soil occupies nearly level to gently sloping relief along the Coosa, Tallapoosa, and Alabama Rivers. Surface runoff is slow to medium and internal drainage is medium. No terracing or drainage is necessary, and the relief is especially favorable for the use of tractors, combines, and other large machinery. Overflows seldom occur.

Profile characteristics:

Surface soil—

0 to 6 inches, reddish-brown to brown friable fine sandy loam; weak fine granular structure.

6 to 10 inches, reddish-yellow friable fine sandy clay or heavy fine sandy loam; weak to moderate fine blocky structure.

Subsoil—

10 to 40 inches, yellowish-red firm clay or clay loam containing some small mica flakes; moderate medium blocky structure.

Underlying material—

40 inches +, yellowish-red firm to friable clay to friable heavy fine sandy loam; contains enough small flakes of mica to have a smooth slightly slick feel when rubbed between the fingers.

This soil is strongly acid throughout. It has a moderate supply of organic matter, medium to high fertility, and moderate to high water-holding capacity. Permeability in the surface soil is moderately rapid to moderate and in the subsoil moderate.

Small areas of Wickham fine sandy loam, low terrace phase, are included. These areas are subject to overflow during periods of extremely high water.

*Use and management.*—Wickham fine sandy loam is responsive to good management, is easily farmed, and is not erosive. It is fairly well suited to crops common to the region, and about 81 percent is cleared and in crops or pasture (fig. 11). A livestock program developed around the production of oats, hay crops, grain sorghum, and pasture is well suited to this soil. Cotton and corn also yield well under good management.



FIGURE 11.—Hereford cattle on Wickham fine sandy loam north of Wetumpka.



**Wickham fine sandy loam, low terrace phase** (0 to 3 percent slopes) (W<sub>D</sub>).—The low terrace phase occurs on slightly lower positions and is more subject to overflows during unusually high water than the normal phase. In some locations the river current or extremely high water is destructive to the surface soil. Normal overflows, however, do not affect it. In places the surface soil is not so deep as on the normal phase, but the subsoil is similar. The soil is practically level, but where slopes are 2 or 3 percent some sheet erosion has taken place. The relief is favorable for power machinery. This strongly acid soil is mapped along the Coosa, Tallapoosa, and Alabama Rivers. A few included areas of Altavista fine sandy loam and Augusta silt loam are less productive than this soil.

*Use and management.*—Approximately 79 percent of Wickham fine sandy loam, low terrace phase, is cleared; the rest is in old-field pine and some sweetgum. The cultivated areas are used largely for oats, cotton, pasture, hay, and corn. Oats are commonly followed by lespedeza; the lespedeza is grazed. An application of 300 to 600 pounds an acre of 6-8-4 or some other high-grade fertilizer is best for cotton, and 150 to 225 pounds of nitrate of soda is sufficient for corn or oats following a cotton crop that has been fertilized heavily. Extremes of wetness and dryness may cause shedding of cotton squares and bolls. Corn production is affected when the soil becomes dry and hard during summer.

**Wickham silt loam** (0 to 2 percent slopes) (W<sub>E</sub>).—Areas of this soil are located along the Coosa, Tallapoosa, and Alabama Rivers on high bottom positions. During extremely high overflows, water backs onto most areas, leaving a shallow deposit of silt that increases productivity. The relief is nearly level. Surface runoff is low and internal drainage medium. Neither drainage nor terracing is needed, and there is little danger of overflow during the cropping season.

Profile characteristics:

Surface soil—

0 to 8 inches, brown friable silt loam; weak fine to medium crumb structure.

Subsoil—

8 to 40 inches, brown to yellowish-red firm smooth clay or silty clay containing some mica; moderate medium blocky structure.

Underlying material—

40 inches +, yellowish-red friable fine sandy loam to fine sandy clay containing a large quantity of small mica flakes; content of fine sand increases with depth; in a few places this layer is light brownish-gray clay with some distinct medium mottles of yellow and brown.

This soil is medium to strongly acid. It contains a medium supply of organic matter, is medium to high in fertility, and has a moderate to high water-holding capacity. Both the surface soil and subsoil are moderately permeable.

Included with this soil are a few areas of Augusta silt loam, which have the same use possibilities as Wickham silt loam.

*Use and management.*—One of the most desirable soils in the county, Wickham silt loam produces good to excellent yields of corn, sorghum (for ensilage), hay, oats, pasture, and cotton. Little or no fertilizer is used except for cotton. This soil is especially well suited to Dallisgrass, white Dutch clover, and lespedeza. The use of 400 to 600 pounds of basic slag or an equivalent quantity of lime and superphosphate is necessary for best pasture development.

**Wickham-Altavista clay loams, eroded sloping phases** (3 to 10 percent slopes) (WB).—This complex comprises extremely mixed areas of the sloping phases of Wickham clay loam and Altavista clay loam. The soils are brown or yellowish-red to yellow clay loams with inclusions of shallow friable heavy sandy loams. They have brown or yellowish-red to yellow firm clay subsoils. The brown to yellowish-red areas have characteristics of the Wickham soils; the yellow, of the Altavista soil. The largest areas occur on the river terraces in the vicinity of Wetumpka, and smaller areas are scattered in the south-central and southeastern parts of the county. Surface runoff is slow to rapid, and internal drainage is medium. The slopes are short and irregular in direction; and where terraces are constructed, they are crooked, necessitating short crooked rows. Severely sheet-eroded spots are present throughout the complex.

The soils of this complex are strongly acid, low in organic-matter and water-holding capacity, and low to medium in fertility. Their surface soil is moderately permeable, and the subsoil is moderately to slowly permeable.

*Use and management.*—A large percentage of Wickham-Altavista clay loams, eroded sloping phases, is wasteland, being too severely eroded for crops or trees. About 45 percent does not have a forest cover and is used as pasture land on which lespedeza supplies most of the grazing. The grazing period lasts only a short time in spring and fall, as the soils dry very rapidly in summer and retard growth of lespedeza and other pasture plants.

#### WORSHAM SERIES

The soil of the Worsham series occurs in the Piedmont province in close association with Cecil, Appling, Durham, and other upland soils. It has a light-gray to gray surface soil and a light-gray or white, mottled with yellow and brown, firm clay subsoil that is slightly plastic when wet. Its small areas are at the base of slopes, bordering the heads of streams, and around intermittent drainageways. Seepage water from the higher lying soils keeps the soil wet the greater part of the time. This strongly acid soil has level to gently sloping relief. Locally some gullies have developed.

The Worsham soil is deep. Almost all of it is in pasture and forest. Productivity for pasture is medium, but with suitable management practices pasture yield can be improved.

**Worsham sandy loam** (0 to 6 percent slopes) (WF).—This gray soil occurs at the base of slopes in association with Appling, Durham, and Cecil soils. The areas are small and narrow and scattered in the northern part of the county. They border intermittent drainageways and heads of small drains. Surface runoff is slow to medium and internal drainage very slow. The slowly pervious subsoil, water from surrounding soils, and seepage make this soil poorly drained.

#### Profile characteristics:

##### Surface soil—

0 to 8 inches, light-gray to gray friable sandy loam having a white appearance in many places when dry; weak fine granular structure.

##### Subsoil—

8 to 40 inches, light-gray or white firm clay having some distinct medium mottles of yellow and brown; moderate to strong medium blocky structure.

Underlying material—

40 inches +, disintegrated granite and granite-gneiss rocks.

Although the profile is underlain by granitic rocks that have contributed material for its formation, some of the parent material undoubtedly has come from local colluvial wash from soils on higher slopes.

This strongly acid soil is low in organic matter and fertility and moderately low in water-holding capacity. The surface soil is moderately to slowly permeable, and the subsoil is very slowly permeable.

*Use and management.*—The 64 percent of Worsham sandy loam that is cleared is used principally for pasture of carpetgrass, Dallisgrass, and lespedeza. Oats, soybeans, sugarcane, and sorghum, grown on a few areas, give fair to good yields under good management. The forested areas are in old-field pine, sweetgum, and blackgum.

## ESTIMATED YIELDS AND SOIL USES AND MANAGEMENT

### ESTIMATED YIELDS

The estimated average yields of crops on the soils of the county are given in table 6. These estimates are based primarily on field observations of the survey party, information furnished by local farmers and others who have had experience in the county, and data of the Alabama Agricultural Experiment Station. Estimates are based on two levels of management. Those in columns A represent estimated average expectable yields under the management commonly practiced, including use of commercial fertilizers for the cash crops but not including systematic rotations with grasses and legumes or intensive water and erosion control measures. Estimates in columns B represent expectable average yields under better management practices such as those recommended by the Alabama Agricultural Experiment Station, some of which are given in this report.

### SOIL USES AND MANAGEMENT

The better farmers of Elmore County are interested in using and managing their soils so that the best growing conditions are obtained for an indefinite period at a minimum cost. That is, they are interested in the highest practical yields that can be maintained. Many of the farmers are now practicing good soil management, and their crop yields are much above the county average. These farmers are following practices that are basic to good farming, such as:

1. Using good crop varieties that are adapted to this county.
2. Following suitable rotations. Generally such rotations will include:
  - (a) a legume to aid in nitrogen maintenance, (b) a tilled crop, (c) a deep-rooted crop to improve soil structure and increase permeability, and (d) pasture.
3. Returning barnyard or green manure to the soil in order to maintain a supply of nitrogen and fresh organic matter.
4. Applying limestone, phosphate, nitrogen, potash, or any combination of these materials, where needed.
5. Taking reasonable care in preparing the seedbed and in following the recommendations of the Alabama Agricultural Experiment Station or the practices of the better farmers.
6. Taking suitable measures to control weeds, insects, and diseases.

TABLE 6.—*Estimated average acre yields of crops on the soils of Elmore County, Ala., under each of two levels of management*

[Crop yields and carrying capacity of pasture in columns A represent those expected under common management practices. In columns B crop yields are those expected under better management that includes such practices as (1) choice and rotation of crops, (2) application of commercial fertilizer, manure, crop residues, and other soil amendments, (3) proper tillage, and (4) control of water on the land by engineering operations. The carrying capacity of pasture in columns B represents that expected under better management practices, which generally include thorough soil preparation, proper seeding of mixtures suited to the soils, correct fertilizing and liming, regulated grazing, and clipping of undesirable herbage]

Soil	Map symbol	Cotton lint		Corn		Winter oats		Pasture	
		A	B	A	B	A	B	A	B
		Lb.	Lb.	Bu.	Bu.	Bu.	Bu.	Cow-acre days <sup>1</sup>	Cow-acre days <sup>1</sup>
Altavista fine sandy loam	AA	200	400	15	35	20	50	175	200
Amite fine sandy loam	AB	350	600	30	50	30	60	175	210
Applying sandy loam	AC	250	400	15	35	15	40	160	190
Augusta silt loam <sup>2</sup>	AD	( <sup>3</sup> )	( <sup>3</sup> )	20	50	25	60	185	225
Bowie sandy loam	BA	350	500	20	50	25	60	175	210
Sloping phase	Bb	300	450	15	45	20	45	175	200
Bradley gravelly sandy loam	Bc	250	400	15	40	20	50	180	200
Rolling phase	Bd	200	350	15	35	15	40	160	180
Cahaba sandy loam	CA	400	600	25	60	30	60	175	210
Cataula gravelly sandy loam	Cb	250	400	15	40	20	40	180	200
Hilly phase	Cc	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Rolling phase	Cd	200	350	12	35	15	35	160	180
Cecil clay loam	Ce	250	500	15	50	20	55	180	200
Rolling phase	Cf	200	400	15	40	15	45	160	180
Cecil sandy loam	Cg	325	500	20	55	25	60	170	210
Chesterfield loamy sand	Ck	350	550	15	50	25	60	( <sup>3</sup> )	( <sup>3</sup> )
Chesterfield sandy loam	Ch	250	400	15	40	20	55	170	200
Rolling phase	Cl	200	350	12	35	20	45	170	200
Congaree fine sandy loam <sup>4</sup>	Cm	250	450	30	50	25	60	175	225
Congaree silt loam <sup>4</sup>	Cn	( <sup>3</sup> )	( <sup>3</sup> )	35	60	( <sup>3</sup> )	( <sup>3</sup> )	175	240
Ducker loam	Da	350	550	25	60	35	65	175	250
Durham sandy loam	Db	300	450	20	50	20	55	175	200
Egam silt loam <sup>4</sup>	Ea	( <sup>3</sup> )	( <sup>3</sup> )	15	30	15	35	175	210
Egam silty clay loam <sup>4</sup>	Eb	( <sup>3</sup> )	( <sup>3</sup> )	10	25	15	30	125	160





TABLE 6.—*Estimated average acre yields of crops on the soils of Elmore County, Ala., under each of two levels of management—Continued*

Soil	Map symbol	Cotton lint		Corn		Winter oats		Pasture	
		A	B	A	B	A	B	A	B
Rough stony land.....	Rg	Lh. ( <sup>3</sup> )	Lh. ( <sup>3</sup> )	Bu. ( <sup>3</sup> )	Bu. ( <sup>3</sup> )	Bu. ( <sup>3</sup> )	Bu. ( <sup>3</sup> )	Cow-acre days <sup>1</sup> ( <sup>3</sup> )	Cow-acre days <sup>1</sup> ( <sup>3</sup> )
Sawyer fine sandy loam.....	SA	250	400	15	50	20	55	175	225
Shubuta and Boswell fine sandy loams.....	SB	200	400	15	45	15	40	175	210
Sloping phases.....	Sc	200	350	15	35	15	40	175	200
Shubuta fine sandy loam.....	S2	250	400	15	45	20	50	175	200
Stough fine sandy loam.....	Sb	( <sup>3</sup> )	( <sup>3</sup> )	20	50	20	50	175	225
Susquehanna clay.....	SE	200	350	10	25	15	45	160	200
Swamp.....	SF	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Vaiden clay.....	VA	200	350	10	25	15	45	175	200
Vance coarse loamy sand.....	VB	250	400	12	35	15	40	125	180
Vance coarse sandy loam, rolling phase.....	Vc	200	350	10	30	15	40	125	180
Vance gravelly sandy loam.....	Vd	250	400	12	40	15	40	175	200
Rolling phase.....	Ve	200	350	10	30	15	40	160	180
Vance loamy sand.....	Vf	250	450	15	50	15	40	175	200
Wehadkee silt loam <sup>2 4</sup> .....	WA	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	150	225
Wickham-Altavista clay loams, eroded sloping phases.....	WB	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	100	150
Wickham fine sandy loam.....	WC	200	350	15	35	25	60	150	200
Low terrace phase.....	WD	150	250	10	30	20	45	150	200
Wickham silt loam.....	WE	250	450	25	60	25	70	175	250
Worsham sandy loam <sup>2</sup> .....	WF	( <sup>3</sup> )	( <sup>3</sup> )	15	35	15	35	150	225

<sup>1</sup> The term "cow-acre-days" is used to express the carrying capacity of pastures. It represents the number of days per year that 1 animal unit can be supported on 1 acre without injury to the pasture, or the product of the number of animal units to the acre multiplied by the number of days of grazing. The animal unit is a means of measuring the feed requirements of livestock. It is the equivalent of 1 mature cow, steer, or horse, 5 hogs, or 7 sheep or goats. For example, the soil type that would provide grazing for 1 cow or 1 animal unit to the acre for 100 days would rate 100

cow-acre-days, and another soil that would provide grazing for 1 cow or 1 animal unit on 4 acres for 100 days would rate 25 cow-acre-days.

<sup>2</sup> Artificial drainage is usually required for production of tilled crops.

<sup>3</sup> Absence of data indicates that the crop is not commonly grown, and the soil is considered unsuitable for its production.

<sup>4</sup> Subject to periodic flooding by stream overflow.

Although these basic practices will apply to most of the soils of the county, the 81 soils mapped do differ in varying degrees in their use, suitability, and management requirements. In order to simplify the discussion of use and management, the soils are divided into 25 management groups according to characteristics that affect their use and management.

The soil groups are discussed separately, experimental results obtained on similar soils are cited, and practices followed and yields obtained by the better farmers are given.

**MANAGEMENT GROUP 1.—NEARLY LEVEL TO GENTLY SLOPING BROWN TO RED SOILS OF THE COASTAL PLAIN WITH FRIABLE SUBSOILS**

This group includes good to excellent crop and pasture soils. About 90 percent of their total acreage is used for row crops each year, and a small percentage is used for pasture. Members of the Amite, Orangeburg, and Red Bay series constitute most of this group. These soils are among the most friable, most easily tilled, most suitable for diversified farming, most responsive to management, least erosive, and most desirable for general farm crops in the county. They become warm early in spring and are among the first in the county to be worked. They have excellent moisture-holding capacity. The subsoils are sufficiently fine in texture to retain moisture and fertilizer, yet they are sufficiently permeable to allow free movement of water in surface soil and subsoil.

The soils making up group 1 are as follows:

Amite fine sandy loam (0 to 3 percent slopes)	Orangeburg gravelly fine sandy loam (0 to 5 percent slopes)
Orangeburg fine sandy loam, slightly eroded phase (0 to 5 percent slopes)	Red Bay sandy loam (0 to 5 percent slopes)
Orangeburg fine sandy loam, eroded phase (0 to 5 percent slopes)	

*Suitable management.*—Very simple crop rotations will serve to conserve and build up the fertility of the soils of group 1. A variety of rotations may be used, the most common being a 2-year one consisting of (a) first year, cotton fertilized with 600 pounds of 6-8-4 per acre and second year, corn fertilized with 36 pounds of nitrogen; or (b) first year, cotton fertilized with 600 pounds of 6-8-4 per acre, followed by winter legumes fertilized with 300 pounds of 16-percent superphosphate or 500 pounds of basic slag.

A 3-year rotation consists of (a) first year, cotton followed by oats; second year, oats followed by cowpeas or soybeans; and third year, corn following winter legumes; or (b) first year, cotton followed by vetch; second year, corn followed by oats; and third year, oats followed by cowpeas or soybeans—winter legumes following the hay crop; or (c) first year, cotton fertilized with 600 pounds of 6-8-4 per acre; second year, peanuts to be hogged; and third year, corn with fertilizer.

These soils are very well suited for general farm crops, and the acreage in pasture is small. Small areas, however, are often used for pasture with good to excellent results when the soil is well prepared, heavily fertilized with phosphatic fertilizers and lime, and seeded to Dallisgrass, white Dutch clover, and annual lespedeza.

Space does not permit a complete discussion of all crops and fertilizers suited to these soils. Furthermore, crop and fertilizer recom-

mendations may change after a few years. Information about the latest experimental results on crop varieties, fertilizers, and management practices may be obtained from the Alabama Agricultural Experiment Station, the Alabama Agricultural Extension Service, or the local agricultural agencies.

**MANAGEMENT GROUP 2.—NEARLY LEVEL TO GENTLY SLOPING GRAY TO LIGHT-BROWN SOILS OF THE COASTAL PLAIN**

The soils of group 2 belong to the Bowie, Faceville, and Gilead series. They are light-colored sandy soils. About 85 percent of their total area is open land used for crops annually. Together with group 1, these soils are among the most friable, most easily tilled, most suitable for diversified farming, most responsive to management, least erodible, and most desirable for general farm crops in the county. They have excellent moisture-holding capacity for crops, and warm early in spring. The subsoils are sufficiently fine in texture to retain moisture and fertilizer, yet they are permeable enough to allow good movement of water in surface soil and subsoil.

The soils included in group 2 are as follows:

Bowie sandy loam (0 to 5 percent slopes)	Faceville sandy loam, thick-surface phase (0 to 5 percent slopes)
Faceville gravelly sandy loam, thick-surface phase (0 to 5 percent slopes)	Gilead sandy loam (0 to 5 percent slopes)

*Suitable management.*—The soils of group 2 are lighter in color, being light gray to yellowish brown, than those of group 1, which are yellowish red to dark reddish brown. They are also a little coarser in texture than those of group 1.

Crop uses and rotations recommended are the same as those for soils of group 1. Soils of group 2 are very well suited to general farm crops and are good to excellent for pasture under good management. The latest experimental results and recommendations for these soils may be obtained from the Alabama Agricultural Experiment Station, the Alabama Extension Service, or the local agricultural agencies.

**MANAGEMENT GROUP 3.—SLOPING GRAY, BROWN, OR RED SOILS OF THE COASTAL PLAIN WITH FRIABLE SUBSOILS**

Soils of the Bowie, Faceville, Orangeburg, and Red Bay series occurring on 5 to 12 percent slopes compose this group. The soils are characterized mainly by rolling relief, sandy surface soils, and friable sandy clay or sandy clay loam subsoils. They differ from soils of groups 1 and 2 in that they are more rolling and difficult to conserve, and fields are more irregular in shape. They are not so well suited to use of large machinery and require more soil-conserving practices. About 45 percent of this group is open land, suited to most locally grown crops if soil-conserving practices are followed.

The soils that make up group 3 are as follows:

Bowie sandy loam, sloping phase (6 to 12 percent slopes).	Orangeburg fine sandy loam, eroded sloping phase (6 to 12 percent slopes).
Faceville-Bowie gravelly sandy loams, sloping phases (6 to 12 percent slopes).	Red Bay fine sandy loam, eroded sloping phase (6 to 12 percent slopes).
Faceville sandy loam, sloping thick-surface phase (6 to 12 percent slopes),	

*Suitable management.*—Well-constructed terraces and cover crops are most beneficial to the soils of group 3. Many areas have been considerably impaired and their moisture-holding capacity restricted by erosion. In many places it is difficult to prevent runoff. Although these soils do not have so much moisture for crop production as those of groups 1 and 2, they have enough for good yields when careful soil management is practiced.

Rotations designed to reduce runoff and control soil erosion are necessary to conserve and build up the fertility of soils of group 3. One of the most satisfactory practices is stripcropping, using sod strips planted alternately with intertilled crops. The rotation may be within each terrace interval, or in alternate intervals and rotated each year. For this system one can use a 2-year rotation consisting of cotton fertilized with 600 pounds of 6-8-4 per acre followed by winter legumes the first year, and corn with fertilizer the second year. The more critical slopes may be permanently sodded to kudzu or sericea lespedeza for hay or pasture. A seed crop may be harvested from the sericea. More information about crops in the rotation systems may be obtained from the Alabama Agricultural Extension Service, the Alabama Agricultural Experiment Station, or the county agricultural workers.

**MANAGEMENT GROUP 4.—GENTLY SLOPING SOILS OF THE COASTAL PLAIN WITH HEAVY SUBSOILS**

These soils, members of the Sawyer, Shubuta, and Boswell series, have sandy surface soils and firm, mottled, heavy clay subsoils. About half their total area is open land. Their slow permeability and billowy to undulating relief make them very susceptible to erosion. Many areas are severely eroded or tend to erode when used for intertilled crops. In many locations gullies have cut deeply into the subsoil. Heavy subsoils and severe erosion result in limited moisture for crops that grow during summer. Many areas therefore are idle or used for unimproved pasture, but the least eroded areas are used in part for general farm crops.

The soils that compose group 4 are as follows:

Sawyer fine sandy loam (0 to 5 per-	Shubuta and Boswell fine sandy loams
cent slopes)	(0 to 5 percent slopes)
Shubuta fine sandy loam (2 to 7 per-	
cent slopes)	

*Suitable management.*—Those areas of soils of group 4 least subject to erosion are used for cotton, corn, and hay crops. By careful soil management, including the use of well-constructed terraces and winter legumes, good crop yields are obtained.

The more eroded areas may be advantageously planted to sericea lespedeza or kudzu to be used for temporary grazing or hay. Those less eroded are well suited to the crops and pasture grasses commonly grown in the county. The better farmers tend to use areas of these soils for improved pastures. They prepare good seedbeds, fertilize with 1,000 to 2,000 pounds an acre of basic slag, or the equivalent in superphosphate and lime, and seed to recommended pasture grasses. Annual lespedeza, sericea lespedeza, white Dutch clover, Dallisgrass, and other grasses do especially well on the fertilized areas.

**MANAGEMENT GROUP 5.—SLOPING SOILS OF THE COASTAL PLAIN WITH HEAVY OR SLIGHTLY CEMENTED SUBSOILS**

The soils of group 5 belong to the Gilead, Shubuta, and Boswell series. They have shallow sandy surface soils and heavy subsoils. About 40 percent of their total area is cleared. These soils are similar to those of group 4 but are more rolling, eroded, and droughty. They are poor to fair for intertilled crops and are not well suited to large machinery because fields are irregularly shaped and relatively small.

The soils included in group 5 are as follows:

Gilead sandy loam, eroded phase (2 to 7 percent slopes)	Shubuta and Boswell fine sandy loams, sloping phases (6 to 12 percent slopes)
Gilead sandy loam, eroded sloping phase (6 to 12 percent slopes)	
Gilead sandy loam, sloping phase (6 to 12 percent slopes)	

*Suitable management.*—Susceptibility to erosion and droughtiness make the soils of group 5 best suited to soil- and moisture-conserving crops rather than to row crops. Long rotations are necessary if the soils are to be conserved. A most common practice is to plant the open areas to sericea lespedeza or annual lespedeza and fertilize with 1,000 to 2,000 pounds of basic slag an acre. Other legumes may be added to develop good improved pasture.

As about 60 percent of the total area of these soils is in forest, considerable attention should be given to forest care and management. The following suggestions are made by the Alabama Extension Service:

1. Clean up following logging; utilize limbs and tops for fuel and pulpwood.
2. Plow or disk land in small strips 15 to 20 feet wide along boundaries; on steep slopes rake off surface litter instead of plowing.
3. Divide large tracts into 20- to 60-acre blocks and construct 15- to 20-foot lanes by plowing, disking, raking, or burning. Clean lanes once each year.
4. Remove disease-infested trees as soon as discovered, cutting them as near ground as possible. Destroy the top, bark, slabs, and other refuse by burning.
5. Thin over-crowded stands of pine, poplar, and other valuable hardwoods to relieve crowding and to permit more rapid growth of better trees. Remove diseased, defective, deformed, and otherwise inferior trees first; if stand is still overcrowded, thin tops of individual trees so that branches will not interlap.
6. Improve pine and hardwood stands by cutting large, overmature, stag-headed, or diseased trees from stand.
7. Thin over-crowded pine stands from October through March; make improvement cuttings in hardwoods at any season.
8. Prune 100 to 150 of better trees per acre to a height of about 17 feet above ground if this does not remove green limbs from more than two-thirds the length of the tree. Trees pruned should not be less than 4 or more than 10 inches in diameter. Use a curved pruning saw on a 10-foot pole handle and prune limbs as close to the trunk as possible.
9. Plant areas to desirable tree species where seedlings and saplings are scattered and seed trees are absent.

**MANAGEMENT GROUP 6.—CLAYEY SOILS OF THE COASTAL PLAIN**

Susquehanna clay (6 to 15 percent slopes) and Vaiden clay (5 to 9 percent slopes) constitute group 6. They are gently rolling to rolling or hilly and are used mainly for pasture and timber.

*Suitable management.*—The soils of group 6 have poor workability and are difficult to till. Consequently their best use is usually for pasture. They are especially well suited to lespedeza, Dallisgrass,



and white Dutch clover, if phosphate, potash, and lime are applied. Use of sericea lespedeza on these soils is becoming a very popular practice, as it affords abundant grazing and aids materially in the control of erosion. Timber, particularly old-field pine, flourishes, and recommendations for management are the same as those given in group 5.

Since these soils are heavy and difficult to till and occur as small fields, they are seldom used for row crops.

**MANAGEMENT GROUP 7.—GENTLY SLOPING LOAMY SANDS OF THE COASTAL PLAIN**

Soils of the Huckabee, Independence, and Lakeland series constitute group 7. About 75 percent of the total area of these soils is cleared. They are sandy and very subject to leaching, and they retain a limited supply of moisture and plant nutrients for the production of crops. They appear to be best suited to peas, peaches, peanuts, and velvetbeans. Cotton and corn are grown, however, and give satisfactory yields where liberal application of manure or commercial fertilizers are used or where winter cover crops have been turned under.

The soils making up group 7 are as follows:

Huckabee loamy sand (0 to 4 percent slopes).	Lakeland loamy sand, shallow phase (0 to 5 percent slopes).
Independence loamy sand (0 to 3 percent slopes).	

*Suitable management.*—Under good management, anticipated average yields are 350 to 450 pounds an acre of cotton and 25 to 45 bushels of corn. Good management includes a rotation system of corn and cotton, with a cover crop to add organic matter and reduce leaching. A rotation consisting of cotton fertilized with 600 pounds of 6-8-8 fertilizer per acre, followed by a winter cover crop in fall, and corn the following year is currently recommended by the Alabama Agricultural Experiment Station. Other rotations consist of lespedeza for pasture for 3 or 4 years, and then cotton and corn for a few years. The rotations discussed in group 1 are applicable, but yields may be considerably less.

Peanuts, grown extensively on these soils in southern Alabama, are generally fertilized with 300 to 400 pounds per acre of 0-14-10 or 4-10-7 when they do not follow a heavily fertilized crop.

**MANAGEMENT GROUP 8.—GENTLY SLOPING SANDS OF THE COASTAL PLAIN**

About 60 percent of Huckabee sand (0 to 4 percent slopes) and Lakeland sand (0 to 5 percent slopes), the soils of this group, is cleared. These light-colored soils are two of the most porous in the county and are among those most subject to leaching. They appear to be best suited to peanuts, velvetbeans, peas, oats, or timber. Many areas are used for cotton, corn, and grain sorghums.

*Suitable management.*—The supply of moisture retained by the soils of group 8 is insufficient for the production of large crop yields, and the fertility level must be raised to obtain satisfactory yields. This is best done by the use of a legume crop, either a winter-growing annual legume, as vetch or Austrian winter peas, or a perennial legume, as kudzu or sericea lespedeza. Crotalaria and other summer legumes have not been so satisfactory for soil improvement as winter legumes. A rotation system may be used that includes a legume

crop grown at least in alternate years with intertilled crops. The better farmers use a 2-year rotation in which cotton is heavily fertilized with 6-8-8 fertilizer and followed by vetch or Austrian peas in fall, which are turned under the next spring and followed by corn. Although this is similar to the rotation recommended for the soils of group 1, yields are only about one-third to two-thirds as high. Further information regarding rotations, cropping systems, and fertilizers is available at the Alabama Agricultural Experiment Station or the Alabama Extension Service.

Those areas in timber support mainly post and blackjack oaks and some old-field pines. Farmers are encouraged to remove the oaks and interplant with old-field pines.

#### MANAGEMENT GROUP 9.—SLOPING SANDS AND LOAMY SANDS OF THE COASTAL PLAIN

Only about 15 percent of this group, composed of Lakeland sand, sloping phase (6 to 12 percent slopes), and Lakeland loamy sand, sloping shallow phase (6 to 12 percent slopes), has been cleared. This group differs from group 7 in that these soils are more rolling, more subject to gully erosion, more difficult to cultivate because of relief, and less retentive of moisture. They are best suited to timber.

*Suitable management.*—Improvement of the timber growth is probably the best management for the soils of group 9. The present growth is largely scrub oak of various species and some old-field pines. Farmers are encouraged to interplant the areas with old-field pine. After the seedlings become established, the post and blackjack oaks are removed. It is considered advantageous to leave the oaks until the pine seedlings are established, because the shade they afford is more important than their competition for moisture. The mortality rate of pine seedlings is high on the soils of this group.

#### MANAGEMENT GROUP 10.—COLLUVIAL SOILS OF THE COASTAL PLAIN

Ducker loam (0 to 2 percent slopes) and Jamison fine sandy loam (0 to 2 percent slopes), the soils of group 10, occur as colluvial deposits in basins and at the foot of slopes. The areas are small. These soils are naturally well adapted to corn, hay crops, or pasture.

*Suitable management.*—Pasture species—particularly lespedeza, Dallisgrass, and white Dutch clover—and hay crops do well on the soils of group 10 if 1,000 to 2,000 pounds of basic slag per acre or the equivalent in superphosphate and lime is applied. Fair to good yields of corn are usually obtained—especially on the Ducker soil—without fertilizer, but 100 to 225 pounds of nitrate of soda an acre is generally beneficial.

In some instances these soils may need artificial drainage, but natural drainage is ample in most places.

#### MANAGEMENT GROUP 11.—SOMEWHAT POORLY DRAINED SANDY SOILS OF THE COASTAL PLAIN

Soils of the Pheba series, on the uplands, and the Izagora and Stough series, on the terraces, constitute group 11. About 70 percent of the total area of these soils is cleared. They are somewhat poorly drained and have light-gray to dark grayish-brown surface soils and light-gray to pale yellowish-brown subsoils, somewhat mottled, particularly in the lower part. The uses being made of these soils

depend almost entirely on the owner or tenant; in some locations they are well improved while in others they are idle. In the main these soils have not been so extensively developed for agriculture as other soils of the county, owing to their need for drainage and their unsuitability for cotton. Under proper management, these soils have good to excellent possibilities for corn, oats, soybeans, lespedeza, sorghum, grain sorghum, and pasture grasses.

The soils included in group 11 are as follows:

Izagora loamy fine sand (0 to 2 percent slopes)	Stough fine sandy loam (0 to 2 percent slopes).
Pheba fine sandy loam (0 to 2 percent slopes)	

*Suitable management.*—Drainage, preferably wide-channel ditches, is the first management requirement of the soils of group 11. Further drainage is effected when fields are ridged. After drainage is provided, almost any crop system centered around corn, oats, soybeans, lespedeza, sorghum, grain sorghum, or pasture has proved to be very good. A rotation of grain sorghum and burclover is becoming popular. In some locations similar soils are used for fall-harvested potatoes, particularly those soils where the clay subsoil is deeper than 12 inches.

#### MANAGEMENT GROUP 12.—GENTLY SLOPING SOILS OF THE PIEDMONT WITH DEEP SANDY SURFACE SOILS

The soils of group 12 belong to the Chesterfield, Durham, Helena, and Vance series. The approximate 80 percent that is cleared is used for crops annually. Like the soils of group 1, these soils are among the most friable, best developed, most easily tilled, most suitable for diversified farming, most responsive to management, least erodible, and most desirable for general farm crops in the county. They have good moisture-holding capacity for crops. Subsoils are sufficiently fine in texture to retain moisture and fertilizer, yet they are sufficiently permeable to allow good movement of water in the surface soil and good to fair movement in the subsoil. The areas are relatively level.

The soils composing group 12 are as follows:

Chesterfield loamy sand (1 to 6 percent slopes)	Helena loamy sand (0 to 5 percent slopes)
Durham sandy loam (0 to 5 percent slopes)	Vance loamy sand (2 to 6 percent slopes)

*Suitable management.*—Most areas of the soils of group 12 should be terraced if used for tilled crops. The soils of this group are similar to those of group 2, and the uses are about the same. The management needed is about the same as for group 1.

#### MANAGEMENT GROUP 13.—GENTLY SLOPING SOILS OF THE PIEDMONT WITH SANDY SURFACE SOILS OF MODERATE DEPTH

The soils of this group—members of the Appling, Bradley, Cataula, Cecil, Chesterfield, Helena, and Vance series—are about 65 percent cleared and 35 percent timbered. These soils occur on undulating to sloping relief and have moderately shallow to fairly deep surface soils. Erodibility is slight to high. They are used mainly for general farm crops, but many areas are idle as a result of rapidly progressing erosion.

The soils that compose group 13 are as follows:

Appling sandy loam (2 to 7 percent slopes)	Chesterfield sandy loam (2 to 7 percent slopes)
Bradley gravelly sandy loam (2 to 6 percent slopes)	Helena sandy loam (2 to 6 percent slopes)
Cataula gravelly sandy loam (0 to 6 percent slopes)	Vance coarse loamy sand (0 to 6 percent slopes)
Cecil sandy loam (2 to 7 percent slopes)	Vance gravelly sandy loam (2 to 7 percent slopes)

*Suitable management.*—To conserve and build the soils of group 13 for desirable production, terracing and the use of close-growing strip crops are necessary.

According to results obtained on the experimental field at Lafayette, Ala., these soils are well suited to most locally grown crops, including alfalfa. For excellent yields of alfalfa it is recommended that 2 to 3 tons of ground limestone per acre, 500 to 1,000 pounds of superphosphate, 50 pounds of potash, and 20 pounds of borax be applied. The lime should be worked into the soil several weeks before planting. At least 25 pounds of seed an acre should be planted as soon after August 15 as possible. Fields should be terraced for general farm crops, after which almost any 2- or 3-year rotation containing a winter legume should be satisfactory. Most commonly used is a 2-year rotation of cotton the first year, fertilized with 600 pounds of 6-8-4 per acre and followed by winter legumes in fall and corn the next spring. The winter legumes should be fertilized with 300 pounds of superphosphate or 500 pounds of basic slag per acre. Pasture (lespedeza, Dallisgrass, and white Dutch clover) gives good to excellent yields when good management practices are followed, including adequate use of lime and phosphate. The more rolling and eroded areas should be planted to sericea lespedeza or kudzu and used for grazing or hay.

#### MANAGEMENT GROUP 14.—GENTLY SLOPING CLAY LOAM SOILS OF THE PIEDMONT

Cecil clay loam (2 to 7 percent slopes) is the only member of this group. The practices suggested for group 13 will apply reasonably well for this soil.

#### MANAGEMENT GROUP 15.—SOILS OF THE PIEDMONT ON ROLLING SLOPES

The soils of group 15 have prevailingly rolling relief. They belong to the Bradley, Cataula, Cecil, Chesterfield, Helena, and Vance series. About 30 percent of the total area of soils of this group is cleared.

These soils differ from those of group 13 principally in that they are more rolling, occurring mainly on slopes of 5 to 12 percent. They are therefore more erosive, more difficult to terrace, less well suited to large machinery, and more restricted in use.

The soils included in group 15 are as follows:

Bradley gravelly sandy loam, rolling phase (7 to 12 percent slopes)	Helena sandy loam, rolling phase (7 to 18 percent slopes)
Cataula gravelly sandy loam, rolling phase (7 to 12 percent slopes)	Vance coarse sandy loam, rolling phase (7 to 12 percent slopes)
Cecil clay loam, rolling phase (8 to 15 percent slopes)	Vance gravelly sandy loam, rolling phase (6 to 12 percent slopes)
Chesterfield sandy loam rolling phase (8 to 12 percent slopes)	

*Suitable management.*—In the management of the soils of group 15, conservation and the retention of moisture should be given primary consideration. The better farmers use most areas for some type of livestock production centered mainly around pasture and grain sorghum production. Stripcropping, wherein sod crops alternate with row crops, is often used. The sodded strips may include whole terrace intervals or cover only half, the rest being planted to intertilled crops.

Greater care for the prevention of forest fires should be taken in the timbered areas, and the more merchantable timber, such as old-field, longleaf, and slash pines, white and red oaks, hickory, and ash, should be protected and allowed to reach maturity.

**MANAGEMENT GROUP 16.—POORLY DRAINED SOILS ON UPLANDS AND COLLUVIAL SLOPES**

Rains loamy sand (0 to 2 percent slopes) and Worsham sandy loam (0 to 6 percent slopes), which comprise group 16, occupy depressed positions, flat areas, or seepage spots. They are not sufficiently drained in their native conditions to be used for row crops. The soils are used to a considerable extent for timber. Many areas are artificially drained and are used principally for pasture and to a lesser extent for sorghum, sugarcane, soybeans, corn, lespedeza, and oats.

*Suitable management.*—Good yields are generally obtained when the soils of group 16 are carefully prepared and the crops are well fertilized. For pasture the areas are generally drained, fertilized with 1,000 pounds of basic slag or with 500 pounds of superphosphate and 2 tons of limestone an acre, and seeded to Dallisgrass, white Dutch clover, and lespedeza.

Fall crops of potatoes, beans, tomatoes, and corn are well suited to the better drained parts. These usually receive a liberal application of mixed fertilizers, preferably 4-10-7 or 6-8-8, at planting time.

**MANAGEMENT GROUP 17.—WELL-DRAINED YELLOW AND BROWN SOILS ON TERRACES OF THE COASTAL PLAIN**

The soils of group 17 belong to the Cahaba and Kalmia series and are about 80 percent open land. They are similar to the soils of group 2, differing mainly in that they occupy slightly lower positions. Like the soils of group 2, these are among the most friable, best developed, most easily tilled, most suitable for diversified farming, most responsive to management, least erodible, and most desirable for general farm crops in the county. They have excellent moisture conditions for crops and warm early in spring. Very few areas need terracing. The subsoils are sufficiently fine in texture to retain moisture and fertilizer, yet they are sufficiently permeable to allow good movement of water in the surface soil and subsoil.

The soils making up group 17 are as follows:

Cahaba sandy loam (0 to 2 percent slopes)	Kalmia loamy sand (0 to 3 percent slopes)
Kalmia sandy loam (0 to 2 percent slopes)	

*Suitable management.*—The cropping practices, rotations, and fertilization discussed in group 1 are equally applicable to the soils of group 17.



**MANAGEMENT GROUP 18.—NEARLY LEVEL SOILS ON TERRACES AND HIGH BOTTOMS OF PIEDMONT AND LIMESTONE VALLEY MATERIALS**

Soils of the Altavista, Egam, and Wickham series make up group 18. Practically all areas are open land. The soils of this group have shallow surface soils and brown, yellowish-red, or yellow firm subsoils. They occupy nearly level positions and are therefore well suited to large machinery. The areas are subject to overflow during prolonged rainy periods, principally in winter. Under common management, row crops give low to fair yields.

The soils that compose group 18 are as follows:

Altavista fine sandy loam (0 to 3 percent slopes)

Egam silt loam (0 to 3 percent slopes)

Wickham fine sandy loam (0 to 3 percent slopes)

Wickham fine sandy loam, low terrace phase (0 to 3 percent slopes)

Wickham silt loam (0 to 2 percent slopes)

*Suitable management.*—The soils of group 18 are best suited to a livestock program developed around oats, pasture, and Johnsongrass hay. Oats followed by lespedeza or cowpeas is one of the best rotations. The oats are generally topdressed with 225 pounds per acre of nitrate of soda or its equivalent in spring. In areas where cotton, with its heavy fertilization, has not recently been grown, oats is usually fertilized with 100 to 300 pounds of 4-10-7 at time of planting.

Pasture, principally Dallisgrass, white Dutch clover, and lespedeza, when fertilized with 1,000 pounds of basic slag or 2 tons of ground limestone and 500 pounds of superphosphate an acre, makes good to excellent growth. Pasture crops, especially lespedeza, may drown out, however, in some locations.

**MANAGEMENT GROUP 19.—SLOPING TO ROLLING SOILS ON TERRACES AND HIGH BOTTOMS, OF PIEDMONT AND LIMESTONE VALLEY MATERIALS**

Egam silty clay loam (0 to 6 percent slopes) and Wickham-Altavista clay loams, eroded sloping phases (3 to 10 percent slopes), which are about one-half cleared, constitute group 19. They are closely associated with and similar to the soils of group 18, but differ in that they occur on more sloping and rolling positions and have been severely damaged by both sheet and gully erosion. They are so severely eroded that they are droughty for crops and are low in organic matter. Very few areas are used for intertilled crops; some are idle, and others are used for pasture or timber.

*Suitable management.*—As the soils of group 19 have only fair to very poor conservability, they should be used for a perennial crop. Some areas adjacent to the Coosa River are subject to overflow during extremely high water and are normally used for pasture or hay. Johnsongrass and lespedeza, native to these areas, give fair yields if basic slag or 300 to 400 pounds of superphosphate an acre is applied.

**MANAGEMENT GROUP 20.—SOMEWHAT POORLY DRAINED SOILS ON TERRACES OF THE PIEDMONT**

The only soil of this group, Augusta silt loam (0 to 2 percent slopes) occurs on flat to slightly depressional terrace positions in association with Wickham and Roanoke soils. Most of it is cleared.

*Suitable management.*—Although drainage is a limiting factor in the maximum utilization, a few ditches generally provide sufficient drainage to make the soil usable for corn, hay crops, sorghums, grain

sorghum, or pasture. With proper management good to excellent yields are obtained. This is one of the best pasture soils in the county where not too subject to flooding, but it needs phosphate and lime for best results. Dallisgrass, white Dutch clover, and lespedeza are the best adapted pasture plants; but in some places during overflow, the first two may be killed back to the roots and the lespedeza may be completely destroyed.

The largest timbered area is immediately north of Jackson Lake and is subject to overflow from the Alabama River during prolonged rainy periods. Despite this hazard, excellent pasture could be established if the areas were cleared and a few main and some lateral ditches cut and other needed practices followed.

**MANAGEMENT GROUP 21.—WELL-DRAINED SOILS ON FIRST BOTTOMS OF PIEDMONT SOIL MATERIALS**

These soils, Congaree fine sandy loam (0 to 2 percent slopes) and Congaree silt loam (0 to 2 percent slopes), occur on first bottoms and are subject to overflow during high water. As their fertility is maintained by overflows, they are among the most fertile soils in the county. Overflows generally occur in winter and early in spring; they rarely come late in summer or in fall when crops would be destroyed. The approximate 65 percent of these soils that is cleared is used mainly for corn, pasture, hay, or sorghum.

*Suitable management.*—Fertilizers are seldom used on the soils of group 21. In some areas billbugs are detrimental to corn and grass in certain years, usually those following prolonged overflows. Crop rotations that avoid grass crops and use intertilled crops are necessary for control of this insect. Soybeans, cowpeas, tomatoes, potatoes, and watermelons should be considered in the cropping system. In those areas least subject to flooding, white Dutch clover and Dallisgrass may be used satisfactorily for pasture, but they are killed back to the roots if flooded more than 2 or 3 days. Corn is the best crop for these soils if the billbug is not too destructive. Grain sorghums, planted thickly to allow for considerable destruction by the billbug, deserve consideration.

**MANAGEMENT GROUP 22.—POORLY DRAINED SOILS OF FIRST BOTTOMS AND TERRACES**

Soils of the Houlka, Myatt, Roanoke, and Wehadkee series and Mixed alluvial land make up group 22. With the exception of Houlka soils, the soils of the group are for the most part in forest of deciduous trees (beech, bay, gum, and water oak). Although these soils are insufficiently drained and some are also subject to frequent overflows, cleared areas have been drained and utilized for pasture, corn, soybeans, sorghum, or fall gardens.

The soils included in group 22 are as follows:

Houlka soils (0 to 2 percent slopes)	Roanoke silt loam (0 to 2 percent slopes)
Mixed alluvial land (0 to 2 percent slopes)	Wehadkee silt loam (0 to 2 percent slopes)
Myatt loamy sand (0 to 2 percent slopes)	

*Suitable management.*—Carpetgrass does well on the cleared and partially drained areas of the soils of group 22, whereas the more desirable Dallisgrass and white Dutch clover may be grown if phos-

phate and lime are applied and the land does not stay flooded more than 2 to 3 days at a time. Oats and fall crops, including potatoes, beans, tomatoes, and corn, are well suited to the better drained part of the silt loam and sandy loam soils of this group. The fall crops normally receive a liberal application of mixed fertilizer, preferably 4-10-7 or 6-8-8, at planting time.

#### MANAGEMENT GROUP 23.—VERY POORLY DRAINED LAND TYPES

Swamp, the only member of group 23, occupies sloughs, bayous, or basins. It is covered with water during winter and continues wet most of summer. None is being used for crops or pasture. The timber growth is largely water-loving vegetation, principally cypress, sweetgum, swamp tupelo, willow, maple, and beech. The best areas are used for forest. These areas that are permanently wet are mainly a refuge and feeding place for wild ducks, but very little effort has been made to grow feed.

#### MANAGEMENT GROUP 24.—BROKEN HILLY AND STEEP SOILS OF THE PIEDMONT

The broken hilly and steep soils included in group 24 are little used for agriculture. They are largely in forest or rangeland pasture, and make fair to good game preserves.

The soils that compose group 24 are as follows:

Cataula gravelly sandy loam, hilly phase (13 to 30 percent slopes)	Rough stony land (6 to 40 percent slopes)
Rough broken land (Cecil soil material) (15 to 60 percent slopes)	

*Suitable management.*—In order to protect the soils of group 24, the forest should be improved. Better fire prevention measures should be undertaken; the more merchantable timber, such as old-field, longleaf, and slash pines, white and red oaks, hickory, tulip-tree, and ash, should be protected in their respective habitats; and a large part of the timber should be allowed to reach maturity.

#### MANAGEMENT GROUP 25.—ROLLING AND HILLY SOILS OF THE COASTAL PLAIN

These soils—Faceville-Bowie gravelly sandy loams, hilly phases (13 to 30 percent slopes) and Rolling and hilly land (Coastal Plain materials) (6 to 30 percent slopes) are largely in forest. They are too broken and hilly for row crops. They are best suited to timber or perennial legumes on the less severely broken relief.

*Suitable management.*—For the preservation of the soils of group 25, the forest needs improved protection against fire. If forest fires are eliminated, the more merchantable timber such as old-field, longleaf, and slash pines, white and red oaks, hickory, tuliptree, and ash are protected, and a large part of the timber is allowed to reach maturity, the forest could be improved. These soils also make fair to good game preserves. They support enough underbrush cover and cane along streams for deer in the larger areas, and enough nuts, beggarticks, mast, native vetch, native lespedeza, French mulberry, and dogwood seeds to feed quail and wild turkey.

### MORPHOLOGY AND GENESIS OF SOILS

Soil is the product of the forces of weathering and soil development acting on the parent material deposited or accumulated by geologic

agencies. The characteristics of the soil at any given point depend on (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and has existed since accumulation; (3) the plant and animal life in and on the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of development have acted on the material. The climate, and its influence on soil and plants, depends not only on temperature, rainfall, and humidity, but also on the physical characteristics of the soil or soil material and on the relief, which, in turn, strongly influences drainage, aeration, runoff, erosion, and exposure to sun and wind.

Elmore County is in the Red-Yellow Podzolic soil region of the United States. Some of the soils are lateritic, although no true laterites have developed. The northern one-fifth of the county is in the Piedmont province physiographic region, and the rest is in the Coastal Plain.

The general surface relief of the county ranges from nearly level or undulating to sloping, rolling, hilly, and steep. The natural surface drainage for the greater part of the soils is good to excessive, and only small areas in the first bottoms and a few flat areas or depressions in the uplands are poorly drained. For the most part, the county has a dendritic drainage system.

The modified continental climate is characterized by long warm summers, short mild winters, and a relatively high rainfall. The moderately high temperatures favor rapid chemical reactions under the moist conditions that exist in the solum most of the time. This high rainfall favors rather intense leaching of the soluble materials, such as alkalis and alkaline earths, particularly from the A horizon, and the translocation of less soluble material and colloidal material downward into the B horizon. The soil is frozen for only short periods and to only shallow depths during winter. The climatic conditions are the same throughout the county, and the relief in many places is similar. The main differences in soil development cannot be attributed to relief and climate, but are due in large measure to the parent material.

All of the soils have developed under a forest cover of deciduous trees and conifers. In the Piedmont province the hardwoods predominate, and in the Coastal Plain longleaf and loblolly pines. The moderate to warm temperatures and heavy rainfall give organic matter little chance to accumulate in the soil. In the forested areas there is a thin covering of leaf mold or forest debris on the surface, and the first 2 or 3 inches of the A horizon contains enough organic matter to produce a gray or brownish-gray color. The soils of the county are prevailing light colored, ranging from gray or yellowish-gray through brown to red.

The living organisms influencing soil development are of primary importance. The common trees root deeply into the soil and upper parent material, feed on plant minerals, bring up bases and phosphorus, and through their leaves deposit the minerals on the soils. In this way some of the essential minerals are returned to the upper part of the soil to counterbalance the leaching processes.

The soils of the county range from medium acid to very strongly acid. All of them belong in the broad class of Pedalfers, which include

all of the soils of the Piedmont province and practically all of the Coastal Plain.

The parent materials of the two physiographic regions are entirely different in their mechanical and chemical composition. The southwestern terminus of the Piedmont province lies in this county. Some of the oldest rocks in the United States are in this province,<sup>6</sup> which is the metamorphic region of the pre-Cambrian and preceding ages. These include the crystalline rocks, such as granite, schist, and gneiss, as well as hornblende gneiss, hornblende schist, and small areas of so-called slate. Angular fragments of quartz are common on the surface, and veins of quartz occur in many of the crystalline rocks. Many of these rocks have disintegrated to depths of 10 to 60 or more feet, and the solum ranges from 2 to 6 or more feet in thickness. The soils in the Piedmont province have developed through the soil-forming processes from the weathered products of these rocks in place. As a result of the wide variation in the rock formations, several distinct soil series have developed. In some instances the same parent material has given rise to two or more soil series.

The Coastal Plain region is covered by the Tuscaloosa formation, which consists of deep beds of varicolored sand, sandy loam, sandy clay, and clay characterized in places by a large quantity of small rounded quartz gravel. The soils developed from the weathering of these materials have predominantly sandy A horizons and friable B horizons. Since there is much variation in the parent materials, relief, and drainage, wide differences exist in the soils.

In addition to the uplands there are rather extensive areas of stream terraces along the Tallapoosa and Coosa Rivers and larger creeks. The soils on these situations have developed from old alluvium, the materials of which have been washed from soils in the Piedmont province as well as from soils in the Coastal Plain. These materials give rise to two groups of soils that differ in their chemical composition and in the consistence of the B horizons. Along most of the streams, particularly the smaller ones, are strips of overflow first bottoms. In these areas the materials are recent alluvium, and the soil range is from uniformly colored and textured soils to those very variable in characteristics.

The soils of the county are grouped in higher categories as (1) zonal, (2) azonal, and (3) intrazonal.<sup>7</sup>

Zonal soils comprise those great groups having well-developed soil characteristics that reflect the influence of the active factors of soil genesis—climate and living organisms, chiefly vegetation. The outstanding characteristics of the texture profile of the normal, or zonal, soil in this county are a comparatively eluviated A horizon underlain by a finer and heavier textured illuviated layer or B horizon, which is usually uniform in color and well-oxidized. Beneath this is the C horizon, which varies considerably in texture but is generally coarser than the B and finer than the A horizon. On some of the soils that had a relatively thick A horizon in their virgin state, accel-

<sup>6</sup> ADAMS, O. I., BUTTS, C., STEPHENSON, L. W., and COOKE, W. GEOLOGY OF ALABAMA. Ala. Geol. Survey Spec. Rept. 14, 312 pp., illus. 1926.

<sup>7</sup> BALDWIN, M., KELLOGG, C. E., and THORP, J. SOIL CLASSIFICATION. *In* Soils and Men, U. S. Dept. Agr. Yearbook 1938, 1232 pp., illus.



erated erosion has removed part or all of the original sandy covering, exposing the yellow or red clay and destroying the normal profile.

Azonal soils represent any group of soils that are without well-developed profile characteristics because of their youth or conditions of parent material or relief that prevent the development of normal soil profile characteristics. These azonal soils in Elmore County are developed from very recent alluvial and colluvial materials and are continually being modified by the deposition of fresh materials from the eroded uplands.

The intrazonal soils are those with more or less well-developed soil characteristics that reflect the dominating influence of some local factor of relief or parent material over the normal effect of the climate and vegetation. Any one of these soils may be associated with two or more of the zonal groups. In this county the parent material, relief, and drainage are largely responsible for the characteristics of the soils of this group.

In table 7 the soil series are classified in orders and great soil groups, and their relief, internal drainage, and degree of profile development are given. The category of many of the soil series is fairly well known, but the category of some of them is uncertain and further study may make modifications necessary. The topographic position, parent material, and natural drainage of the separate series are given in table 4 in the section on Soils.

### ZONAL SOILS

In this county the zonal soils are represented by two great soil groups—Red-Yellow Podzolic and Reddish-Brown Latosols.

Red-Yellow Podzolic soils are defined as a group of well-developed, well-drained acid soils having thin organic ( $A_0$ ) and organic-mineral ( $A_1$ ) horizons over a light-colored bleached ( $A_2$ ) horizon over a red, yellowish-red, or yellow more clayey (B) horizon. Coarse reticulate streaks or mottles of red, yellow, brown, and light gray are characteristic of deep horizons of Red-Yellow Podzolic soils where parent materials are thick. Parent materials in this county are more or less siliceous.

Red-Yellow Podzolic soils are developed under deciduous, coniferous, or mixed forest in warm-mesothermal to tropical humid to perhumid climates. In cultivated areas the  $A_0$  and  $A_1$  horizons are incorporated in the plow layer; and in many places accelerated erosion has removed all or nearly all of the A horizon, leaving the B exposed. The clay fraction is usually dominated by kaolinite, but contains considerable free ferric oxides or hydroxides and, in places, a relatively small proportion of aluminum hydroxide. Hydrous mica and montmorillonite dilute the clay fraction in some of the soils, but are not considered to be typical. In any specific parent material the reticulate streaks generally occur higher in the profiles with yellow B horizons than in those with red B horizons; and in a few members of the group, especially the very sandy ones, the streaked material may be absent. Other well-developed, well-drained red and yellow soils, without podzolic morphology, are associated with Red-Yellow Podzolic soils.

TABLE 7.—*Classification of the soil series of Elmore County, Ala., in higher categories, and the relief, internal drainage, and distinctness of profile development of each*

## ZONAL

Great soil group and series	Relief	Internal drainage	Degree of profile development	
			As indicated by number of major horizons	As indicated by contrast in horizons
Red-Yellow Podzolic:				
Red members:				
Orangeburg-----	Nearly level to sloping; some rolling-----	Medium-----	Medium-----	Strong.-----
Faceville-----	Nearly level to sloping; hilly-----	do-----	do-----	Medium.-----
Shubuta-----	Nearly level to sloping-----	Slow-----	do-----	Strong.-----
Boswell-----	do-----	Very slow-----	do-----	Do.-----
Cecil-----	Undulating to rolling or sloping-----	Medium-----	do-----	Do.-----
Cataula-----	Nearly level to hilly-----	Slow-----	do-----	Do.-----
Bradley-----	Undulating to rolling or sloping-----	Medium-----	Strong <sup>1</sup> -----	Do. <sup>2</sup> -----
Cahaba-----	Nearly level-----	do-----	Medium-----	Medium.-----
Wickham-----	Nearly level to sloping-----	do-----	do-----	Do.-----
Yellow members:				
Bowie-----	Nearly level to sloping or rolling-----	do-----	do-----	Do.-----
Gilead-----	Nearly level to sloping; some rolling-----	Slow-----	Strong-----	Do.-----
Sawyer-----	Level to gently sloping-----	do-----	Medium-----	Strong.-----
Durham-----	Nearly level to gently sloping-----	Medium-----	do-----	Medium.-----
Appling-----	Undulating to gently sloping-----	do-----	do-----	Strong.-----
Vance-----	Nearly level to rolling; some sloping-----	Slow-----	Strong-----	Do.-----
Chesterfield-----	Nearly level to sloping or rolling-----	Medium-----	do <sup>1</sup> -----	Do. <sup>2</sup> -----
Kalmia-----	Level to gently sloping-----	do-----	Medium-----	Medium.-----
Izagora-----	Level or nearly level-----	Medium to slow-----	Strong-----	Strong.-----
Altavista-----	Level to gently undulating-----	Medium-----	Medium-----	Medium.-----
Reddish-Brown Latosols: <sup>3</sup>				
Red Bay-----	Level to sloping-----	do-----	do-----	Strong.-----
Amite-----	Nearly level to gently sloping-----	do-----	do-----	Medium.-----

## INTRAZONAL

Planosols:					
Fragipans:					
Pheba	Level or nearly level	Slow	Strong	Strong	Strong.
Stough	Nearly level to slightly depressional	do	do	do	Do.
Augusta	Nearly level	Medium to slow	do	do	Do.
Worsham	Level to gently sloping	Very slow	Medium	do	Do.
Roanoke	Level or slightly depressional	do	do	do	Do.
Claypans:					
Helena	Nearly level to rolling; some hilly or strongly sloping	Slow	Strong	Strong	Do.
Low-Humic Gley:					
Rains	Level or nearly level	Very slow	Medium	Medium	Medium.
Myatt	Nearly level or slightly depressional	Slow to very slow	do	do	Do.
Wehadkee	Level or nearly level	Very slow	Weak	do	Weak.
Houlka	Level or slightly depressional	Slow	do	do	Medium.

## AZONAL

Regosols:					
Lakeland	Level to sloping or rolling; some strongly sloping or hilly	Medium to rapid	Medium	Medium	Weak.
Huckabee	Level to gently sloping or undulating	Rapid	Weak	Weak	Do.
Independence	Level to gently sloping	Medium to rapid	do	do	Do.
Vaiden	Gently sloping to sloping	Slow	Strong	Strong	Strong. <sup>2</sup>
Susquehanna	Sloping to hilly	Very slow	Weak	Weak	Do. <sup>2</sup>
Alluvial soils:					
Ducker	Level or nearly level	Medium	do	do	Weak.
Jamison	do	do	do	do	Do.
Egam	Level to gently sloping	Slow	Medium	Medium	Medium. <sup>2</sup>
Congaree	Level or nearly level	Medium	Weak	Weak	Weak.

<sup>1</sup> Extra horizons are chiefly due to geologic differences.<sup>2</sup> Contrast in horizons is chiefly due to geologic differences.<sup>3</sup> Latosol has been proposed to replace Laterite as a Great Soil

Group, and Reddish-Brown Latosol then would replace Reddish-Brown Lateritic.

The following is a profile description of Orangeburg fine sandy loam, a red member of the Red-Yellow Podzolic great soil group. This profile is located 8 miles north of Wetumpka on Rockford Road.

- A<sub>1</sub> 0 to 6 inches light brownish-gray (10YR 6/2) loose fine sandy loam; weak granular structure.
- A<sub>2</sub> 6 to 12 inches, pale yellow (2.5Y 7/4) loose fine sandy loam; essentially structureless.
- B<sub>1</sub> 12 to 15 inches, yellowish-red (5YR 5/8) very friable light sandy clay loam; moderate medium granular structure.
- B<sub>2</sub> 15 to 40 inches, red (2.5YR 4/8) friable sandy clay loam; moderate medium subangular blocky structure.
- C 40 inches +, red (2.5YR 4/8) friable sandy clay loam; essentially structureless.

Reddish-Brown Latosols include a zonal group of soils with dark reddish-brown granular surface soils, red friable clay B horizons, and red or reticulately mottled lateritic parent material. They were developed under humid tropical climate with wet-dry seasons and tropical forest vegetation.

Laterization, with little or no podzolization, has dominated soil development. Laterization is the process of silica removal, with consequent increase in the alumina and iron content and decrease in base-exchange capacity of the soil. The Reddish-Brown Latosols do not have the podzolic morphology with light grayish A<sub>2</sub> horizons, characteristic of the geographically associated Red-Yellow Podzolic soils developed from siliceous parent materials.

#### INTRAZONAL SOILS

The intrazonal soils include members of the Planosols and Low-Humic Gley great soil groups.

Planosols may be defined as intrazonal soils <sup>8</sup> having one or more horizons abruptly separated from and sharply contrasting to adjacent horizons because of cementation, compaction, or high clay content. They are found under forest or grass vegetation in mesothermal to tropical perhumid to semiarid climates, usually but not always with a fluctuating water table. In many instances the cemented or compacted horizons lie beneath a moderately well or well developed B horizon that has a higher percentage of clay than the A horizon.

The Planosols in this county are subdivided into fragipans and claypans, depending on the composition of the pans and their position in the soil profile. Fragipans <sup>9</sup> are very compact horizons, rich in silt, sand, or both, and usually relatively low in clay. They commonly interfere with water and root penetration. They are found in soils developed from both residual and transported parent materials. In this county the soils of the Pheba, Stough, and Augusta series are classified as somewhat poorly drained fragipans, and those of the Worsham and Roanoke series, as poorly drained fragipans.

Claypans, also called argipans,<sup>9</sup> are compact soil horizons or layers rich in clay and separated more or less abruptly from the overlying layer. The soils of the Helena series are classified as claypans in this county.

<sup>8</sup> THORP, J., and SMITH, G. D. HIGHER CATEGORIES OF SOIL CLASSIFICATION. Soil Sci. 67 (1949): 117-126, illus.

<sup>9</sup> SOIL SURVEY STAFF. SOIL SURVEY MANUAL. U. S. Dept. Agr. Handbook No. 18, 503 pp., illus. 1951.

Low-Humic Gley soils are an intrazonal group of somewhat poorly to poorly drained soils with very thin surface horizons, moderately high in organic matter, over mottled gray and brown gleylike mineral horizons with little textural differentiation. They range in texture from sand to clay, and the parent materials vary widely in physical and chemical properties. These soils occur largely under a natural cover of swamp forest, and perhaps of marsh plants in some areas. A large proportion of them range from medium to very strongly acid in reaction. Very few are neutral or alkaline.

In this county the Low-Humic Gley soils belong to the Rains, Myatt, Wehadkee, and Houlka series. The organic-matter content is usually medium or fair, but in some areas it is low or very low. Acidity is strong to very strong in all except the Houlka soils, which are medium acid.

#### AZONAL SOILS

The azonal soils include members of the Regosols and Alluvial soils great soil groups.

Regosols may be defined as an azonal group of soils consisting of deep unconsolidated rock (soft mineral deposits) in which few or no clearly expressed soil characteristics have developed. They are largely confined to recent sand dunes, to loess and glacial drift of steeply sloping lands, and to colluvial material. In this county the Regosols have formed from thick beds of sands or loamy sands, or thick beds of clay or sandy clay of the Coastal Plain. The Lakeland, Huckabee, and Independence series are Regosols derived from the coarse-textured material and the Susquehanna and Vaiden series are those from the finer textured materials.

Alluvial soils are defined as an azonal group of soils, developed from transported and relatively recently deposited material (alluvium), and characterized by a weak modification (or none) of the original material by soil-forming processes. In Elmore County the Ducker, Jamison, Egam, and Congaree series are classified as Alluvial soils.

The Ducker soil is derived from recent alluvial and colluvial material from red soils of the Coastal Plain; the Jamison soil is derived from recent alluvial and colluvial materials from gray and yellow soils of the Coastal Plain. Differences in parent materials are the chief features that differentiate these soils.

The Egam soils occupy high first bottoms. They are derived from alluvial materials washed from soils underlain by limestone, shale, and a mixture of Coastal Plain and Piedmont province materials.

The Congaree soils occur on first bottoms that are subject to periodic overflow by streams. New material is deposited by stream overflow, and the soils have little opportunity to form genetic profiles.

Congaree silt loam, which may be considered as representative of Alluvial soils, had this profile in an area 4 miles south of Wetumpka along the Coosa River.

1. 0 to 1 inch, brown silt loam containing some partly decomposed leaf mold and organic matter.
2. 1 to 8 inches, brown friable silt loam of granular structure.
3. 8 to 36 inches, brown to brownish-yellow friable to granular silt loam to silty clay loam.
4. 36 inches +, brownish-yellow loose friable fine sandy loam containing many small mica flakes.



## GLOSSARY

**Alluvium.** Fine material, such as sand, mud, or other sediments, deposited on land by streams.

**Clay.** The small mineral soil grains, less than 0.002 mm. (.000079 in.) in diameter. (Formerly included the grains less than 0.005 mm. in diameter.)

**Colluvium.** Deposits of rock fragments and soil material accumulated at the base of slopes through the influence of gravity. Colluvium includes creep and local wash and in many areas is relatively mixed.

**Consistence.** A soil term expressing degree of cohesion and the resistance to forces tending to deform or rupture the aggregate. The relative mutual attraction of the particles in the whole mass, or their resistance to separation. Terms used to describe consistence include brittle, compact, firm, friable, plastic, sticky, and stiff.

**Brittle.** Term used to describe a soil that when dry will break with a sharp, clean fracture, or if struck a sharp blow, shatters into cleanly broken hard fragments.

**Compact.** Dense and firm but without any cementation.

**Firm.** Resistant to forces tending to produce rupture or deformation.

**Friable.** A kind of consistence of most soils. Readily crushed by application of gentle to moderate force.

**Plastic.** A kind of consistence of wet soils. Readily deformed without rupture; friable but cohesive; can be readily molded.

**Sticky.** Adhesive rather than cohesive when wet, but usually very cohesive when dry. When wet, soil shows a decided tendency to adhere to other material and objects.

**Stiff.** Resistant to deformation or rupture; firm, tenacious, and tending toward imperviousness. Usually applied to soil in place and moderately wet.

**Erosion, soil.** The wearing away or removal of soil material by water or wind.

**Fertility, soil.** The capacity of a soil to supply the amounts, kinds, and proportions of nutrients needed for normal growth of specified plants when other conditions such as water, light, and heat are favorable.

**First bottom.** The normal flood plain of a stream; land along the stream subject to overflow.

**Genesis** (*See also* Horizon). Mode of origin of the soil, referring particularly to the processes responsible for the development of the solum (horizons A and B) from the unconsolidated parent material.

**Granular** (*See also* Structure type). Roughly spherical aggregates that may be either hard or soft, usually more firm than in crumb structure and without the distinct faces of blocky structure.

**Great soil group (soil classification).** A broad group of soils having common internal soil characteristics.

**Horizon, soil.** Layer or part of the soil profile approximately parallel to the land surface and having well-defined characteristics.

**Horizon A.** The upper horizon of the soil mass, from which material has been removed by percolating water; the eluviated part of the solum; the surface soil. It is generally subdivided in two or more subhorizons, of which A<sub>0</sub> is not a part of the mineral soil but the accumulation of organic debris on the surface. Other subhorizons are designated as A<sub>1</sub>, A<sub>2</sub>, and so on.

**Horizon B.** The horizon of deposition, to which materials have been added by percolating water; the illuviated part of the solum; the subsoil. This horizon may also be divided into several subhorizons, depending on the color, structure, consistence, or character of the material deposited. These layers are designated as B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, and so on.

**Horizon C.** The horizon of partly weathered material underlying the B horizon; the substratum; usually the parent material.

**Internal drainage.** Refers to the movement of water through the soil profile. This rate is affected by the texture of the surface soil and subsoil, and by the height of the ground water table, either permanent or perched. Relative terms for expressing internal drainage are the following: Very rapid, rapid, medium, slow, very slow, and none.

**Leaching, soil.** Removal of materials in solution.

**Massive** (*See also* Structure, grade). Large uniform masses of cohesive soil, sometimes with ill-defined and irregular breakage, as in some of the fine-textured alluvial soils; structureless.

**Morphology.** The physical constitution of the soil expressed in the kinds of horizons, their thickness and arrangement in the profile, and the texture, structure, consistence, porosity, and color of each horizon.

**Mottles, soil.** Contrasting color patches<sup>10</sup> that vary in number and size. Descriptive terms are as follows: Contrast—faint, distinct, and prominent; number—few, common, and many; and size—fine, medium, and coarse. The size measurements are the following: Fine, commonly less than 5 mm. [about 0.2 in.] in diameter along the greatest dimension; medium, commonly ranging between 5 and 10 mm. [about 0.2 to 0.6 in.] along the greatest dimension; and coarse, commonly more than 15 mm. [about 0.9 in.] along the greatest dimension.

**Natural drainage.** Refers to those conditions that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be due to other causes, as sudden deepening of channels or sudden blocking of drainage outlets. The following relative terms are used to express natural drainage: Excessively drained, somewhat excessively drained, well drained, moderately well drained, imperfectly or somewhat poorly drained, poorly drained, and very poorly drained.

**Nutrients, plant.** The elements taken in by the plant, essential to its growth, and used by it in the elaboration of its food and tissue. These include nitrogen, phosphorus, calcium, potassium, magnesium, sulphur, iron, manganese, copper, boron, zinc, and perhaps others, which are obtained from the soil; and carbon, hydrogen, and oxygen, obtained largely from the air and water.

**Parent material** (*See also* Horizon C, Profile, and Substratum). The unconsolidated mass from which the soil profile develops.

**Permeable.** Easily penetrated, as by water or air.

**Productivity, soil.** The capacity of a soil to produce a specified plant (or plants) under a given system of management.

**Profile, soil.** A vertical section of the soil, from the surface into the parent material.

**Relief.** The elevations or inequalities of the land surface, the slope gradient, and the pattern of these.

**Sand.** Small rock or mineral fragments with diameters ranging between 0.05 mm. (0.002 in.) and 1.0 mm. (0.039 in.). The term sand is also applied to soils containing 90 percent or more of sand.

**Silt.** Small mineral soil grains ranging from 0.05 mm. (0.002 in.) to 0.002 mm. (0.000079 in.) in diameter.

**Soil.** An organized natural body occurring on the surface of the earth, characterized by conformable layers resulting from modification of parent material by physical, chemical, and biological forces through various periods of time.

**Soil textural classes.** Classes of soil based on the relative proportion of soil separates or individual size groups of soil particles such as sand, silt, or clay. The principal textural classes, in increasing order of the content of the finer separates, are as follows: Sand, loamy sand, sandy loam, loam, silt loam, clay loam, and clay.

**Structure, soil.** The morphological aggregates in which the individual soil particles are arranged. It may refer to their natural arrangement in the soil when in place and undisturbed or at any degree of disturbance. Soil structure is classified according to grade, class, and type.

**Grade.** Degree of distinctness of aggregation; expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: Structureless (single grain or massive), weak, moderate, and strong.

**Class.** Size of soil aggregates. Terms: Very fine or very thin, fine or thin, medium, coarse or thick, and very coarse or very thick.

**Type.** Shape of soil aggregates. Terms: Platy, prismatic, columnar, blocky, subangular blocky, granular (nonporous), and crumb (porous). (Example of soil-structure grade, class, and type: Moderate coarse subangular blocky.)

**Solum** (*See also* Horizons A and B). The genetic soil developed by soil-building processes. In normal soils the solum includes the A and B horizons, or the upper part of the soil profile above the parent material.

<sup>10</sup> SIMONSON, R. W. DESCRIPTION OF MOTTLING IN SOILS. *Soil Sci.* 71 (1950): 187-192. (Reprinted, 1951.)

**Subsoil.** Technically, the B horizon; roughly, that part of the profile below plow depth.

**Substratum** (*See also* Horizon C and Parent Material). Material underlying the subsoil.

**Surface runoff.** This term refers to the amount of water removed by flow over the surface of the soil. The amount and rapidity of surface runoff are affected by factors such as texture, structure, and porosity of the surface soil; the vegetative covering; the prevailing climate; and the slope. Relative degrees of surface runoff are expressed in 6 classes as follows: Very rapid, rapid, medium, slow, very slow, and ponded.

**Surface soil.** Technically, the A horizon; commonly, the part of the upper profile usually stirred by plowing.

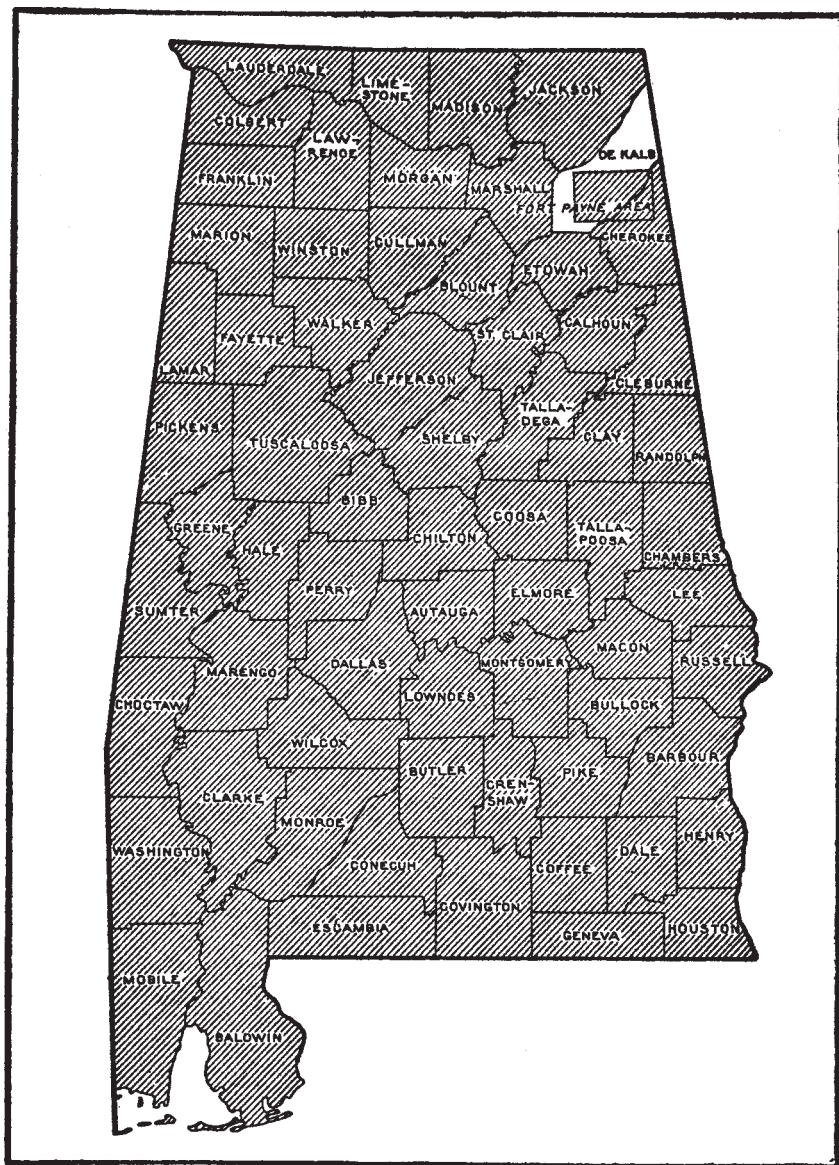
**Terrace (for control of surface runoff, erosion, or both).** A broad surface channel or embankment constructed across sloping land on or approximately on contour lines at specific intervals. The terrace intercepts surplus surface runoff to retard it for infiltration or to direct the flow to an outlet at nonerosive velocity.

**Terrace (geologic).** An old alluvial plain, usually flat or smooth, bordering a stream; frequently called a second bottom as contrasted to the flood plain; seldom subject to overflow.

**Texture.** Reflects proportion of various size of individual particles making up the soil mass. A coarse-textured soil is one high in sand; a fine-textured soil has a large proportion of clay.

**Upland (geologic).** Land consisting of material unworked by water in recent geologic time and lying in general at higher elevations than the alluvial plain or stream terrace.





Areas surveyed in Alabama shown by shading.



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